

**TOSHIBA Satellite Pro M10 Series
Portable Personal Computer
Maintenance Manual**

TOSHIBA CORPORATION

File Number 960-431

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TOSHIBA Satellite Pro M10 Series Portable Personal Computer Maintenance Manual

First edition February 2003

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Preface

This maintenance manual describes how to perform hardware service maintenance for the TOSHIBA Satellite Pro M10 Series Portable Personal Computer, referred to as Satellite Pro M10 Series in this manual.

The procedures described in this manual are intended to help service technicians isolate faulty Field Replaceable Units (FRUs) and replace them in the field.

SAFETY PRECAUTIONS

Four types of messages are used in this manual to bring important information to your attention. Each of these messages will be italicized and identified as shown below.

DANGER: “Danger” indicates the existence of a hazard that could result in death or serious bodily injury, if the safety instruction is not observed.

WARNING: “Warning” indicates the existence of a hazard that could result in bodily injury, if the safety instruction is not observed.

CAUTION: “Caution” indicates the existence of a hazard that could result in property damage, if the safety instruction is not observed.

NOTE: “Note” contains general information that relates to your safe maintenance service.

Improper repair of the computer may result in safety hazards. TOSHIBA requires service technicians and authorized dealers or service providers to ensure the following safety precautions are adhered to strictly.

- ❑ Be sure to fasten screws securely with the right screwdriver. If a screw is not fully fastened, it could come loose, creating a danger of a short circuit, which could cause overheating, smoke or fire.
- ❑ If you replace the battery pack or RTC battery, be sure to use only the same model battery or an equivalent battery recommended by TOSHIBA. Installation of the wrong battery can cause the battery to explode.

The manual is divided into the following parts:

- Chapter 1 Hardware Overview describes the Satellite Pro M10 Series system unit and each FRU.
- Chapter 2 Troubleshooting Procedures explains how to diagnose and resolve FRU problems.
- Chapter 3 Test and Diagnostics describes how to perform test and diagnostic operations for maintenance service.
- Chapter 4 Replacement Procedures describes the removal and replacement of the FRUs.
- Appendices The appendices describe the following:

- Handling the LCD module
- Board layout
- Pin assignments
- Keyboard Scan/Character Codes
- Key layout
- Wiring diagrams
- BIOS Rewrite Procedures
- Reliability

Conventions

This manual uses the following formats to describe, identify, and highlight terms and operating procedures.

Acronyms

On the first appearance and whenever necessary for clarification acronyms are enclosed in parentheses following their definition. For example:

Read Only Memory (ROM)

Keys

Keys are used in the text to describe many operations. The key top symbol as it appears on the keyboard is printed in **boldface** type.

Key operation

Some operations require you to simultaneously use two or more keys. We identify such operations by the key top symbols separated by a plus (+) sign. For example, **Ctrl + Pause (Break)** means you must hold down **Ctrl** and at the same time press **Pause (Break)**. If three keys are used, hold down the first two and at the same time press the third.

User input

Text that you are instructed to type in is shown in the boldface type below:

DISKCOPY A: B:

The display

Text generated by the computer that appears on its display is presented in the type face below:

```
Format complete  
System transferred
```

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Chapter 1

Hardware Overview

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1.1 Features

The TOSHIBA Satellite Pro M10 Series Portable Personal Computer uses extensive Large Scale Integration (LSI), and Complementary Metal-Oxide Semiconductor (CMOS) technology extensively to provide compact size, minimum weight, low power usage and high reliability. The computer is built and configured to order, to best meet the customer's needs. This computer incorporates the following features and benefits:

Processor

The computer comes with one of the following processors, which incorporates 64KB of L1 cache memory and 1MB of L2 cache memory:

- Intel Pentium M Processor 1.3GHz
- Intel Pentium M Processor 1.4GHz
- Intel Pentium M Processor 1.5GHz
- Intel Pentium M Processor 1.6GHz

Memory

The computer comes with two PC2100 compatible DDR SDRAM slots, which accommodate 128/256/512MB/1GB PC2100 SO-DIMMs.

HDD

The following four sizes of HDDs are available:

- 27.94GB (30.0 billion bytes)
- 37.26GB (40.0 billion bytes)
- 55.89GB (60.0 billion bytes)

FDD

An external USB 3.5-inch FDD accommodates both 2HD (1.44MB) and 2DD (720KB) disks.

DVD-ROM Drive

A full-size, DVD-ROM drive module lets the user run either 12 cm (4.72") or 8 cm (3.15") CD/DVDs without using an adaptor. It runs DVD-ROMs at maximum 8 speed and CD-ROMs at maximum 24 speed.

❑ CD-RW/DVD-ROM Drive

A full-size, CD-RW/DVD-ROM drive module that lets the user run CD/DVDs without using an adaptor. It reads DVD-ROMs at maximum 8 speed and CD-ROMs at maximum 24 speed. It writes CD-R at up to 8 speed and CD-RW at up to 8 speed. For reading, this drive supports the same formats as the DVD-ROM drive.

❑ DVD Multi Drive

A full-size DVD Multi drive enables DVD-RAM media to be read, written and erased with random access like a diskette. Data can be rewritten hundreds of thousands of times over the life of a disk. The drive also reads all CD and DVD formats.

❑ Display

The computer comes with one of the following displays:

- 14.1-inch XGA TFT LCD (1024 × 768 pixels with 16M colors)
- 15.0-inch XGA TFT LCD (1024 × 768 pixels with 16M colors)
- 15.0-inch SXGA+ TFT LCD (1400 × 1050 pixels with 16M colors)
- 15.0-inch UXGA TFT LCD (1600 × 1200 pixels with 16M colors)

A video controller and 32MB of VRAM enables an external monitor with an RGB cable to display 64k colors at a resolution of 1600 × 1200 pixels.

❑ Keyboard

An easy-to-use 85/86-key keyboard provides a numeric keypad overlay for fast numeric data entry or for cursor and page control. The keyboard also includes two keys that have special functions in Microsoft Windows XP. It supports software that uses a 101- or 102-key enhanced keyboard.

❑ Touch pad

The computer has a touch pad in its palm rest with two control buttons and a wheel. The Touch pad enables control of the on-screen pointer and scrolling of windows.

❑ Accupoint

This pointer control stick, located in the center of the keyboard, provides convenient control of the cursor.

Sound system

This computer supports software sound (AC97 Audio). The sound system is equipped with AC97 Audio, a CODEC chip, stereo speakers, an internal microphone, and jacks for headphone and external microphone. The sound system is equipped with the following:

- Stereo speakers
- Volume control
- Headphone jack
- Internal microphone
- External microphone jack

 PC Card Slot

A PC Card Slot accommodates two 5mm cards (Type II) or one 10.5mm (Type III) card, which support the PC Card Standard Release 1997 cards and are ready for advanced cards, including PC Card 16's multifunction cards and CardBus 32-bit cards.

 SD Card Slot (SD Card model only)

Some models of computer are equipped with an SD Card slot that can accommodate Secure Digital flash memory cards with capacities of 8MB, 16MB, 32MB, 64MB and 256MB. SD cards let the user easily transfer data from devices, such as digital cameras and Personal Digital Assistants, that use SD Card flash-memory. The cards have a high-level of security and copy protection features.

 Universal Serial Bus (USB)

The computer comes with two USB ports that comply with the USB 2.0 standard. The USB 2.0 enables daisy-chain connection of up to 127 USB-equipped devices and 480Mbps serial data transfer. It is designed for easy configuration by a Plug-and-Play operating system and provides hot insertion/ejection capability.

 IEEE 1394 (IEEE 1394 model only)

Some models of computer come with one IEEE 1394 port. It allows for the connection of up to 63 devices and provides 100, 200 and 400Mbps/sec transfer rates. It supports hot insertion/ejection capability so there is no need to restart the computer when the user attaches a new peripheral.

Parallel port

A Centronics compatible parallel port enables connection of a printer or other parallel device. The port supports Extended Capabilities Port (ECP) conforming to IEEE-1284.

 Video out

This video-out mini-jack enables transfer of NTSC or PAL data (video and right/left audio) to external devices such as a TV.

 Internal LAN (BTO)

The computer can be equipped with LAN circuits on a built-to-order basis. The LAN functions support Ethernet LAN (10 megabits per second, 10BASE-T) and Fast Ethernet LAN (100 mega bits per second, 100 BASE-Tx). It also supports Wakeup on LAN (WOL) and Magic Packet.

 Internal modem

The internal modem is equipped as a modem daughter card (MDC).

The internal modem provides capability for data and fax communication and supports ITU-T V.90. For data reception it operates at 56,000bps and for data transmission it operates at 33,600bps. For fax transmission it operates at 14,400bps. The speed of data transfer and fax depends on analog telephone line conditions. It has an RJ11 modem jack for connecting to a telephone line.

 Wireless LAN (BTO)

Some models of the computer come with a wireless LAN Mini PCI Card. The computer has two antennas in the display panel to send and receive the radio wave for the wireless LAN.

 Bluetooth

The computer comes with a Bluetooth module that supports Bluetooth wireless technology, which enables wireless connection to compatible devices.

 Infrared Port

The infrared port is compatible with Fast InfraRed (FIR) standards enabling wireless 4Mbps data transfer with Infrared Data Association (IrDA) 1.1 compatible devices.

 Internet button

This button launches an Internet browser. When the computer is powered off, this button automatically boots up the system and launches an Internet browser.

❑ TOSHIBA Console button

This button launches an application automatically. The default is TOSHIBA Console.

❑ TV button

This button sets the display device to TV (Video-out). Press it again to return to LCD.

❑ CD/DVD Play button (provided with some models)

This button directly launches various CD and DVD functions. The user can also turn on the computer's power by holding down this button for one second and turn off the power by holding it down for 0.5 second.

❑ Digital Audio Play button (provided with some models)

This button directly launches various digital audio functions. The user can also turn on the computer's power by holding down this button for one second.

❑ Audio/Video Control buttons (provided with some models)

These buttons control the playback of audio and video.

- Previous button: Plays the previous track/chapter/data.
- Play/pause button: Begins or pauses play.
- Stop button: Halts play.
- Next button: Plays the next track/chapter/data.

❑ Wireless Communication Switch and Indicator

The computer can make other devices such as medical equipment malfunction by electromagnetic radiation. The wireless communication switch on the left side of this computer enables the user to make the computer stop transmitting radio waves from the antennas. The wireless communication LED indicates whether the computer is sending the radio wave or not.

❑ Slim Select Bay

Slim Select Bay is a single-drive bay that accommodates a CD-ROM drive, DVD-ROM drive, CD-R/RW drive, CD-RW/DVD-ROM drive, DVD-RAM drive, Slim Select Bay HDD adaptor or Slim Select Bay 2nd battery pack. The TOSHIBA Mobile Extension enables hot docking of modules when you are using a plug and play operating system.

❑ Docking interface port

A 242-pin, docking interface port enables connection of an optional Advanced Port Replicator II. It provides additional features as follows:

- AC adaptor
- One Parallel port
- One Serial port
- One PS/2 mouse port
- One PS/2 keyboard port
- One Line-in jack
- One Line-out jack
- Two USB ports (comply with USB 2.0 standard)
- One IEEE1394 port
- One External monitor port
- One DVI port (not support)

❑ Batteries

The computer has two batteries: a lithium-ion main battery pack and RTC battery (that backs up the Real Time Clock and CMOS memory). An optional secondary battery can be installed in the Slim Select Bay to increase the battery operating time.

The computer is shown in figure 1-1. The system unit configuration is shown in figure 1-2.

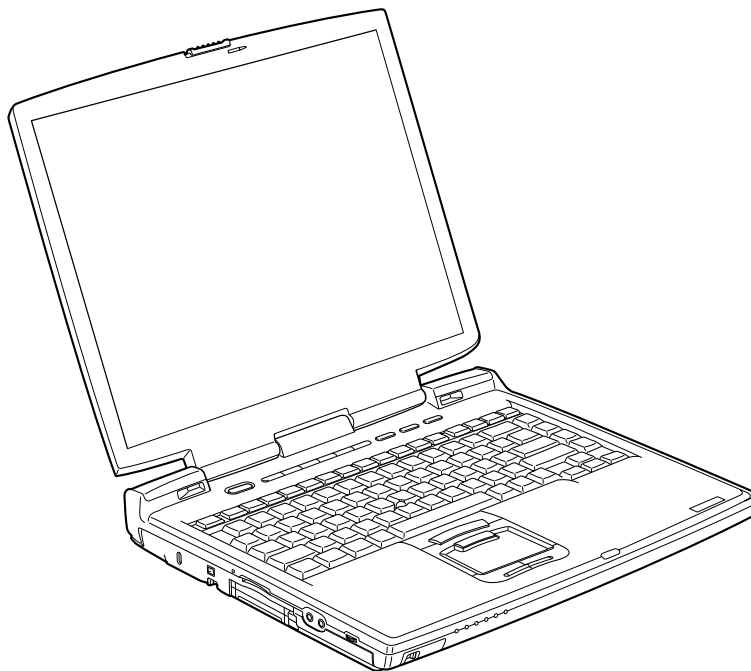


Figure 1-1 Front of the computer

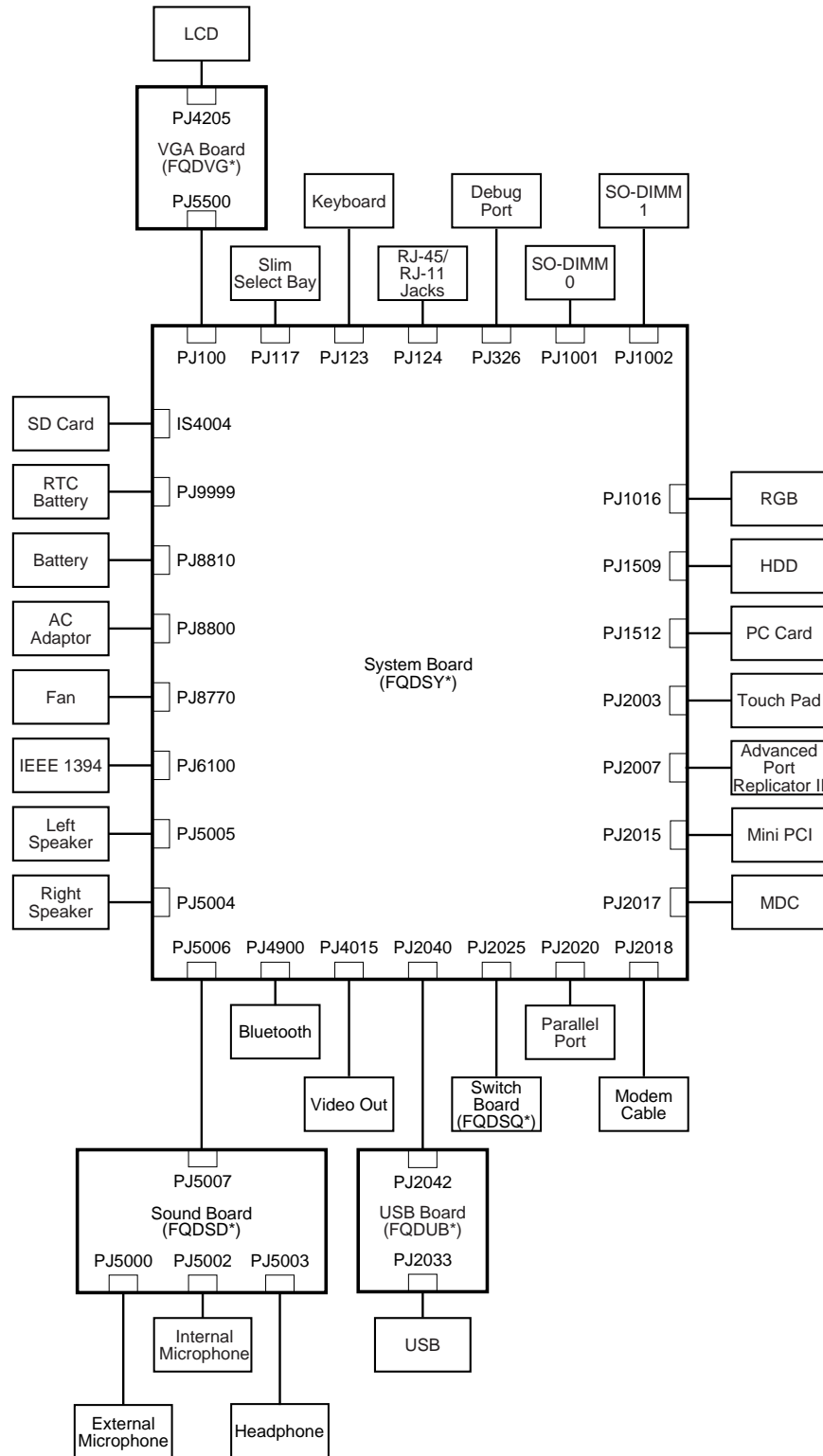


Figure 1-2 System unit configuration

1.2 System Unit Block Diagram

Figure 1-3 is a block diagram of the system unit.

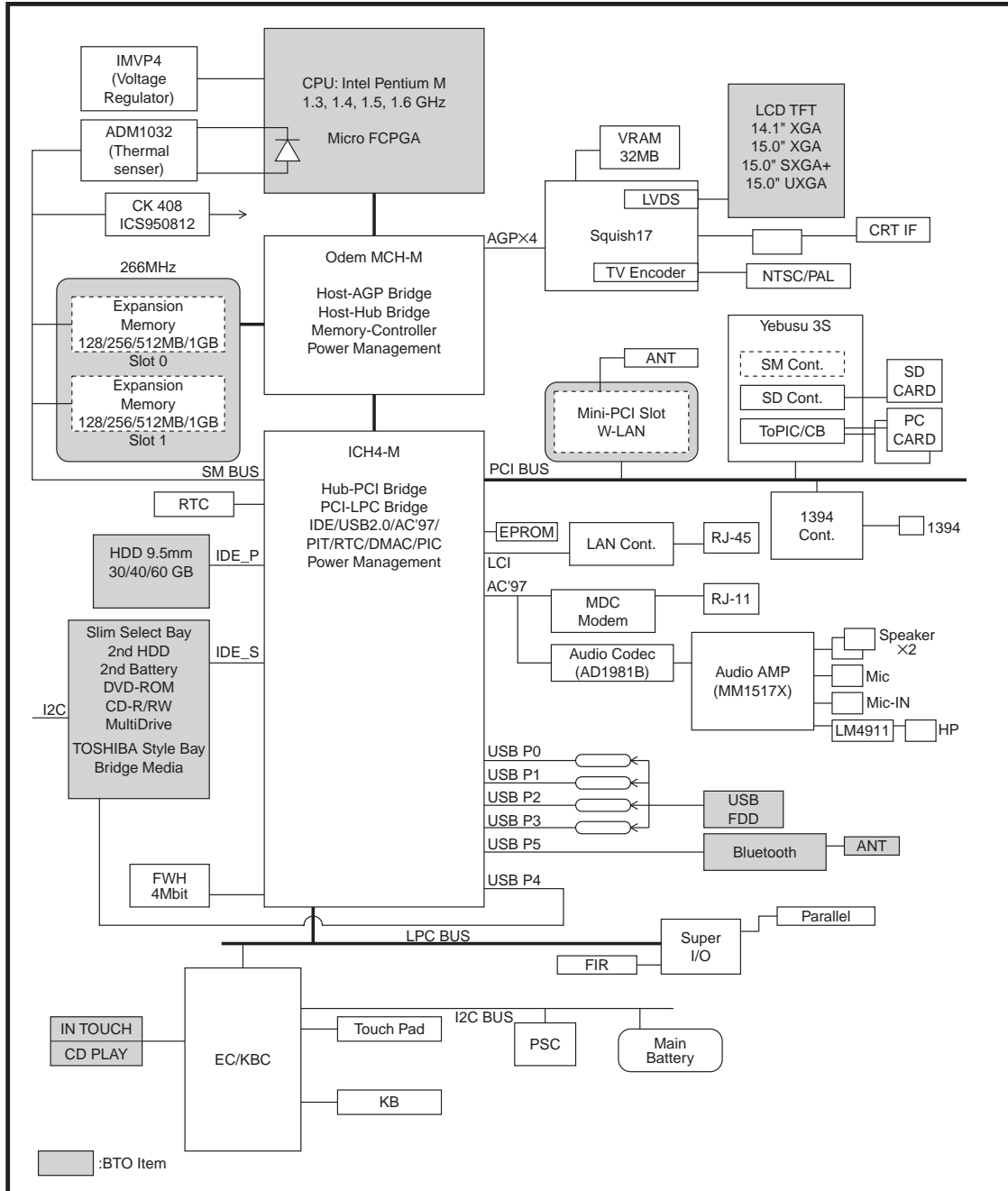


Figure 1-3 System unit block diagram

The system unit is composed of the following major components:

❑ Processor

- Intel Pentium M Processor 1.3GHz
 - Processor core speed: 1.3GHz at 1.35V
 - Processor bus speed: 400MHz at 1.05V
 - Integrated L1 cache memory: 64KB
 - Integrated L2 cache memory: 1MB
 - Integrated NDP

- Intel Pentium M Processor 1.4GHz
 - Processor core speed: 1.4GHz at 1.35V
 - Processor bus speed: 400MHz at 1.05V
 - Integrated L1 cache memory: 64KB
 - Integrated L2 cache memory: 1MB
 - Integrated NDP

- Intel Pentium M Processor 1.5GHz
 - Processor core speed: 1.5GHz at 1.35V
 - Processor bus speed: 400MHz at 1.05V
 - Integrated L1 cache memory: 64KB
 - Integrated L2 cache memory: 1MB
 - Integrated NDP

- Intel Pentium M Processor 1.6GHz
 - Processor core speed: 1.6GHz at 1.35V
 - Processor bus speed: 400MHz at 1.05V
 - Integrated L1 cache memory: 64KB
 - Integrated L2 cache memory: 1MB
 - Integrated NDP

❑ Chip Set

- Intel Odem MCH-M (Memory Controller Hub)
 - Mobile Pentium M Processor support
 - DDR200/266 support (Max 1GB)
 - DRAM control
 - AGP V2.0 compliant (×4 mode)
 - PCI R2.2 compliant
 - ACPI 1.0b compliant
 - 593-ball 37.5×37.5mm FC-BGA package 0.18μm process

- Intel ICH4-M (I/O Controller Hub)
 - PCI Rev.2.2 support (6 PCI REQ/GNT pairs)
 - Bus master IDE controller (Ultra ATA 100/66/33)
 - USB 2.0 controller 6 ports (EHCI: Enhanced Host Controller)
 - I/O APIC
 - SMBus Controller
 - FWH I/F (BIOS)
 - LPC I/F (EC/KBC, Super I/O)
 - IRQ Controller
 - Serial Interrupt functions
 - Power Management functions
 - Deeper Sleep (C4) support
 - ACPI 1.0 support
 - Suspend/Resume control
 - AC'97 2.2 I/F
 - Integrated RTC
 - Integrated LAN Controller (WfM 2.0)
 - 421-ball 31×31mm BGA package

□ Firmware Hub (FWH)

- One Intel 82802AB is used.
- This gate array has the following features:
 - Intel platform compatibility
 - Firmware hub hardware interface mode
 - Industry-standard packages
 - Two configurable interfaces
 - 4Mbits of flash memory for platform code/data nonvolatile storage
 - Address/Address-Multiplexed (A/A Mux) interface/mode
 - Case temperature operating range
 - Vcc: 3.3V ± 0.3V
 - Vpp: 3.3V and 12V for fast programming (80 hours maximum)

❑ Card Controller:

- Name: YEBISU3S
- This gate array has the following functions and components.
 - PCI Interface (PCI Rev. 2.2)
 - Chipset Interface
 - CardBus/PC Card Controller (Yenta2 Ver. 2.2)
 - SD Card Controller (SDHC Ver. 1.2)
 - SD I/O Card Controller (Ver. 1.0)
 - Smart Media Controller (SMHC Ver.01/SMIL 1.0)
 - Smart Card I/F
 - SIO (UART) Controller (MS Debug Port Specification Ver. 1.0)
 - Docking Station Interface
 - External device interface

❑ Graphic Controller:

- Name: nVIDIA Squish17
 - AGP bus R2.0 ×4
 - LCD I/F LVDS 2ch
 - TV Encoder NTSC/PAL
 - External VRAM: DDR-SDRAM 220MHz 32MB (64bit)

❑ LAN controller

- One ED82562 chip is used.
- This gate array has the following features:
 - IEEE 802.3 10BASE-T compliant physical layer interface
 - IEEE 802.3u Auto-Negotiation and 100BASE-TX support
 - Digital adaptive equalization control
 - Link status interrupt capability
 - Boundary scan support
 - 3-port LED support (speed, link and activity)
 - 10BASE-T auto-polarity correction
 - Diagnostic loopback mode
 - 1:1 transmit transformer ratio support
 - Low power (300mW typical in active transmit mode)
 - Reduced power in "unplugged mode" (less than 50mW)
 - Automatic detection of "unplugged mode"
 - 3.3V device
 - 48-pin Shrink Small Outline Package (SSOP)

- ❑ KBC/EC (Keyboard Controller/Embedded Controller)
 - One M306K9FCLRP chip functions as both KBC and EC.
 - KBC has the following functions:
 - Scan controller to check status of keyboard matrix
 - Interface controller between the keyboard scan controller and the system
 - EC has the following functions:
 - Power supply sequence control
 - System I/F
 - Thermal conditions control
 - Flash rewriting
- ❑ PSC (Power Supply Controller)
 - One TMP87PM48U chip is used.
 - This controller controls the power sources.
- ❑ Super I/O
 - One SMSC LPC47n227 is used.
 - This gate array has the following functions and components.
 - Serial Port (NS16C550 Compatible UART)
 - Infrared Communications Controller (IrDA v1.2 Support)
 - Parallel Port (PS/2 Compatible Bidirectional and IEEE 1284 Compliant EPP/ECP)
- ❑ IEEE 1394 Link Layer /Physical Layer Controller
 - One TSB43AB22 is used.
 - This controller provides the IEEE 1394 link/physical function, and is compatible with serial bus data rates of 100Mbits/s, 200Mbits/s and 400Mbits/s.
- ❑ PC Card Power Switch
 - One MIC2563A is used.
 - The MIC2563A handles the power supply for the PC Card slot.
- ❑ SD Card Power Switch
 - One MAX1607ESA is used.
 - The MAX1607ESA is a current-limited switch, which has several safety features to ensure that the SD Card Slot is protected.
- ❑ USB Power Switch
 - One MAX1922ESA is used.
 - The MAX1922ESA is a current-limited switch for two USB ports, which has several safety features to ensure that the USB port is protected.

CD Play Controller

- One OZ168 is used.
- The OZ168 allows music CD play while the computer is off.

 Sound CODEC

- One AD1981B is used.
- The AD1981B is an AC'97 Audio CODEC LSI, which is compliant with the industry standard "Audio CODEC '97" specification (Revision 2.3).

 RS232 Transceiver

- One MAX3243 chip is used.
- The MAX3243 is a serial communication interface with automatic shutdown/wakeup features, high data-rate capabilities, and enhanced electrostatic discharge (ESD) protection.

 Infrared Transceiver

- One HSDL-3602 is used.
- The HSDL-3602 is an infrared transceiver module that provides interface between logic and IR signals for through-air, half-duplex IR data link. The module is compliant to IrDA Physical Layer Specifications 1.1.

 Battery E² PROM: ST24C04FM

- One ST24C04FM equivalent (128 words × 16-bit, I²C-Interface) is used.
- This memory maintains records of battery use.

 Clock Generator

- One ICS950812 is used.
- This device generates the system clock.

 Temperature Monitor

- One ADM1032 is used.
- The ADM1032 is an ACPI compliant two channel digital thermometer and under/over temperature alarm.

1.3 3.5-inch Floppy Disk Drive

The external USB 3.5-inch FDD is a thin, high-performance reliable drive that supports 720KB (formatted) 2DD and 1.44MB (formatted) 2HD disks.

The FDD is shown in Figure 1-4. The specifications for the FDD are listed in Table 1-1.

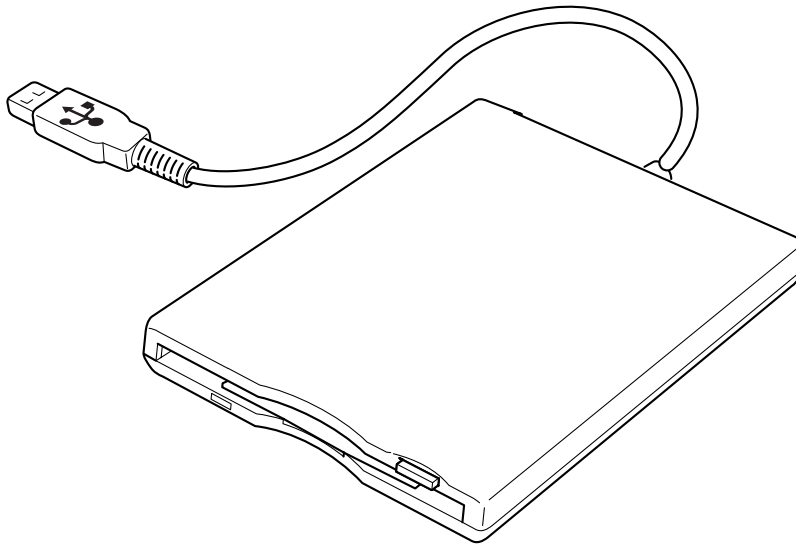


Figure 1-4 3.5-inch FDD

Table 1-1 3.5-inch FDD specifications

Item	2MB mode	1MB mode
Storage capacity (KB)		
Unformatted	2,000	1,000
Formatted	1,440	720
Number of heads	2	2
Number of cylinders	80	80
Recording method	Modified Frequency Modulation (MFM)	

1.4 2.5-inch Hard Disk Drive

The removable HDD is a random-access, non-volatile storage device. It has a non-removable 2.5-inch magnetic disk and mini-Winchester type magnetic heads. The computer supports a 30, 40, or 60GB HDD.

The HDD is shown in figure 1-5. Specifications are listed in Table 1-2.

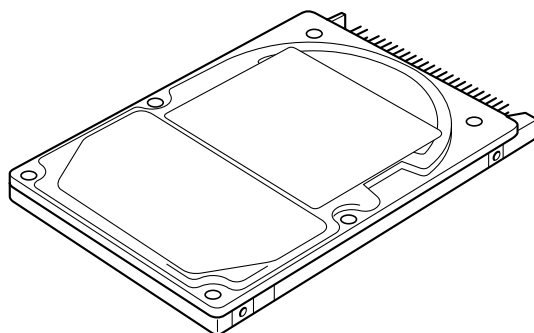


Figure 1-5 2.5-inch HDD

Table 1-2 2.5-inch HDD specifications

Items	TOSHIBA MK3021GAS	TOSHIBA MK4021GAS	TOSHIBA MK4019GAX
	HITACHI DK23EA-30 (30.0 billion bytes)	HITACHI DK23EA-40 (40.0 billion bytes)	HITACHI DK23EB-40 (40.0 billion bytes)
Formatted capacity(GB)	27.94	37.26	37.26
Logical Blocks(LBA)	58,605,120	78,140,160	78,140,160
Rotational speed (rpm)	4,200	4,200	5,400
Buffer (KB)	2,048	16,384	8,194
Bytes per sector	512	512	512

Items	TOSHIBA MK6021GAS	TOSHIBA MK6022GAX
	HITACHI DK23EA-60 (60.0 billion bytes)	(60.0 billion bytes)
Formatted capacity(GB)	55.89	55.89
Logical Blocks(LBA)	117,210,240	117,210,240
Rotational speed (rpm)	4,200	5,400
Buffer (KB)	2,048	16,384
Bytes per sector	512	512

1.5 DVD-ROM Drive

The DVD-ROM drive is capable of driving either 12cm (4.72-inch) or 8cm (3.15-inch) DVD/CDs without an adaptor. It reads DVDs at maximum 8-speed and reads CDs at maximum 24-speed.

The DVD-ROM drive is shown in Figure 1-6. Specifications for the DVD-ROM drive are listed in Table 1-3.

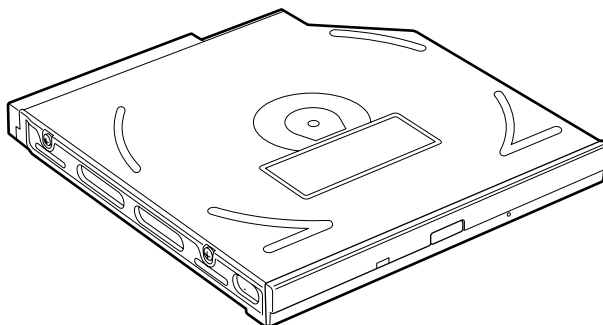


Figure 1-6 DVD-ROM drive

Table 1-3 DVD-ROM drive specifications

Item	DVD-ROM mode	CD-ROM mode
ATAPI Burst (Mbytes/s)	33.3 (Ultra DMA) 16.7 (PIO mode 4/Multi word DMA mode 2)	
Access time (ms) Average Random Access	110	85
Rotation speed (rpm)	4,594 Max	5,136 Max
Data Buffer Capacity (Kbytes)	512	
Supported Format	DVD-ROM, DVD-Video, DVD-R, CD-DA, CD-ROM (MODE-1, MODE-2), CD-ROM XA MODE-2 (FORM-1, FORM-2), Photo CD (Multi & Single Session), CD-TEXT, Enhanced CD Addressing method 2	

1.6 Multi Drive

The Multi drive accommodates either 12cm (4.72-inch) or 8cm (3.15-inch) CDs and CD-R/RWs or DVDs. It reads DVDs at a maximum 8-speed and CDs at a maximum 24-speed.

The Multi drive is shown in Figure 1-7. Specifications for the Multi drive are listed in Table 1-4.

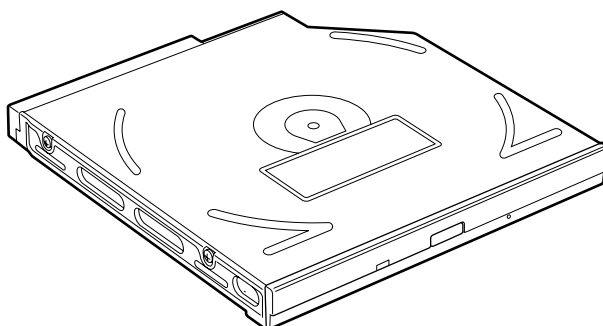


Figure 1-7 Multi drive

Table 1-4 Multi drive specifications (1/2)

Item	Matsushita UJDA740		
	DVD-ROM (Play mode)	CD-ROM (Play mode)	CD-R/CD-RW (Record mode)
ATAPI Burst (Mbytes/s)	33.3 (Ultra DMA mode 2) 16.7 (PIO Mode 4, Multi word DMA mode 2)		
Access time (ms) Average 1/3 Stroke Access	180	130	-
Data Buffer Capacity (Mbytes)	2		
Supported Format	DVD: DVD-ROM, DVD-VIDEO, DVD-R (read) CD: CD-DA, CD-Text, Photo CD, CD-ROM Mode 1/Mode 2, CD-ROM XA Mode 2 (Form 1, Form 2), Enhanced CD (CD-EXTRA), CD-G (Audio CD only), Addressing Method 2		CD-DA, CD-Text, Photo CD, CD- ROM Mode 1/ Mode 2, CD-ROM XA Mode 2 (Form 1, Form 2), Enhanced CD (CD-EXTRA), CD-G (Audio CD only), Addressing Method 2

Table 1-4 Multi drive specifications (2/2)

Item	TEAC DW-224E-36		
	DVD-ROM (Play mode)	CD-ROM (Play mode)	CD-R/CD-RW (Record mode)
ATAPI Burst (Mbytes/s)	33.3 (Ultra DMA mode 2) 16.7 (PIO Mode 4, Multi word DMA mode 2)		
Access time (ms) Average 1/3 Stroke Access	180	130	-
Data Buffer Capacity (Mbytes)	2		
Supported Format	DVD: DVD-ROM, DVD-VIDEO, DVD-R (read) CD: CD-DA, CD-Text, Photo CD, CD-ROM Mode 1/Mode 2, CD-ROM XA Mode 2 (Form 1, Form 2), Enhanced CD (CD-EXTRA), CD-G (Audio CD only), Addressing Method 2		CD-DA, CD-Text, Photo CD, CD- ROM Mode 1/ Mode 2, CD-ROM XA Mode 2 (Form 1, Form 2), Enhanced CD (CD-EXTRA), CD-G (Audio CD only), Addressing Method 2

1.7 DVD Multi Drive

The DVD Multi drive (Panasonic UJ-810BTJ7-A) is capable of driving either 12cm (4.72-inch) or 8cm (3.15-inch) DVD/CDs without an adaptor.

The DVD Multi drive is shown in Figure 1-8. Specifications for the DVD Multi drive are listed in Table 1-5.

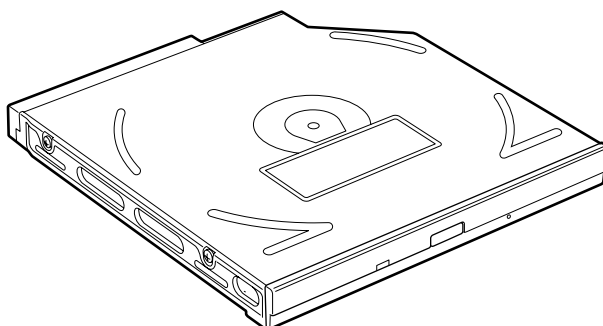


Figure 1-8 DVD Multi drive

Table 1-5 DVD Multi drive specifications

Item	DVD-ROM (Play mode)	CD-ROM (Play mode)	CD-R/RW, DVD-R/RW (Record mode)
ATAPI Burst (Mbytes/s)	33.3 (Ultra DMA mode 2) 16.7 (PIO Mode 4, Multi word DMA mode 2)		
Access time (ms)			
Random Access (Ave.)	100 (Typ.)	95 (Typ.)	-
Random Seek (Ave.)	95 (Typ.)	90 (Typ.)	-
Full Stroke Access (Ave.)	160 (Typ.)	160 (Typ.)	350 (Typ.)
Data Buffer Capacity (Mbytes)	2		
Supported Format	DVD: DVD-ROM (DVD-5, DVD-9, DVD-10, DVD-18), DVD-R (Ver.1.0, Ver.2.0), DVD-RW (Ver.1.0, Ver.1.1), DVD-RAM Ver.2.1/1.0 CD: CD-DA, CD+(E)G, CD-MIDI, CD-TEXT, CD-ROM, CD-ROM XA, CD-I, CD-I Bridge (Photo-CD, Video-CD), Multisession CD (Photo-CD, CD-EXTRA, CD-R, CD-RW, Portfolio), CD-R, CD-RW		DVD-R (Ver2.0 for General), DVD-RW (Ver1.1) CD-R/RW: CD-DA, CD+(E)G, CD-MIDI, CD-ROM, CD-ROM XA, MIXED MODE CD, CD-I, CD-I Bridge (Photo-CD, Video-CD), Multisession CD (Photo-CD, CD-EXTRA, CD-R, CD-RW, Portfolio)

1.8 Power Supply

The power supply distributes 11 different voltages to the system board and performs the following functions:

1. A/D conversion

The power supply controller (PSC) uses 10-bit sampling for A/D conversion to determine the following values:

- AC adaptor voltage and current
- PR/CDOC voltage and current
- Main and Secondary Batteries voltage, current and temperature
- Output voltage – S3V, 1R5-C1V, 1R8-C1V, PPV, 1R2-P1V, BGVSNS, 2R5SNS-B2V, A5V, 1R25-P1V, E3V, 2R5-B2V

2. AC adaptor and battery check

The PSC checks the following by A/D converted values:

- AC adaptor connected
- PR/CDOC connected
- Battery installed

3. Abnormal check

The PSC determines whether the condition is abnormal, and if so, stores an error code into the error register.

4. Input port management

The PSC monitors the following input signal status:

- System power ON/OFF status

5. Beep and LED control

The PSC makes a beep when the battery is low.

The PSC controls the following two kinds of LED:

DC IN LED (two colors: orange and green)

- Green = indicates AC adaptor is connected
- Orange = indicates an error

Battery LED (two colors: orange and green)

- Green = The battery is fully charged.
- Orange = The computer is quick-charging the battery. / The battery is low.

6. Power ON/OFF sequence

When power is turned on or off, the PSC starts the power on or off sequence.

- SQ0-4 = power ON sequence
- SQ5-B = power OFF sequence

7. Battery charging control

The PSC controls the following.

- The quick charge ON/OFF
- The trickle charge ON/OFF
- The detection of full charge

8. Detection of the low battery

The PSC detects the low battery point by the battery voltage, current and temperature.

- LB10M = The system will be driven by the battery for 10 more minutes.
- LB0 = The battery won't be able to drive the system after a few more minutes.
- LB1 = The battery can drive the system only during the suspend process.
- LB2 = The battery cannot drive the system.

9. New battery installation

When a new battery is installed, the PSC communicates with the E²PROM in the battery to read information of the newly installed battery.

10. Battery capacity calculation

The PSC updates the battery capacity counter. And, the PSC converts it into remaining time and percentage of capacity.

11. Command data sending

The PSC sends power commands to the EC.

The power supply output rating is specified in Table 1-6.

Table 1-6 Power supply board output rating

Use	Name	Voltage (V)	Power supplied Yes/No		
			Stand by	Power off	No battery
CPU (core)	PPV	1.3	No	No	No
CPU (bus), MCH-M, ICH4-M	PTV	1.075	No	No	No
VGAC	BGV	1.35	Yes	No	No
HDD, Keyboard, Touch Pad, Accupoint, Mini PCI, Bluetooth, FL	P5V	5.0	No	No	No
ICH4-M, FWH, Clock Generator, ADM1032AR, SD Card, Mini PCI, Super I/O, FIR, IEEE 1394, LCD, CODEC	P3V	3.3	No	No	No
MCH-M, ICH4-M	1R8-P1V	1.81	No	No	No
MCH-M, ICH4-M, VGAC	1R5-P1V	1.5	No	No	No
SO-DIMM, MCH-M	1R25-P1V	1.25	Yes	No	No
OZ168	S5V	5.0	Yes	Yes	No
ICH4-M, EC/KBC	S3V	3.3	Yes	Yes	No
ICH4-M	1R5-S1V	1.5	Yes	Yes	No
VGAC, PC Card	B5V	5.0	Yes	No	No
YEBISU3S, VGAC, PC Card, Mini PCI, MDC, Serial	B3V	3.3	Yes	No	No
MCH-M, VGAC, SO-DIMM, VRAM	2R5-B2V	2.51	Yes	No	No
CODEC, Ext. Microphone, Int. Microphone, Headphones, USB, Slim Select Bay	E5V	5.0	Yes	No*	No
ICH4-M, 82562ET	E3V	3.3	Yes	No*	No
PSC	MCV	5.0	Yes	Yes	No
ICH4-M (RTC)	R3V	2.0 - 3.6	Yes	Yes	Yes

*: These items are supplied with power if the wake-up function is enabled.

1.9 Batteries

The computer has three types of batteries:

- Main battery pack
- Optional secondary battery pack (installed in the Slim Select Bay)
- RTC battery

The battery specifications are listed in Table 1-7.

Table 1-7 Battery specifications

Battery name	Material	Output voltage	Capacity
Main battery	Lithium-Ion	10.8 V	6,600 mAh or 4400mAh
Secondary battery	Lithium-Ion	10.8 V	3,600 mAh
RTC battery	Lithium-Ion	3.0 V	17mAh

1.9.1 Main Battery

The removable main battery pack is the computer's main power source when the AC adaptor is not attached. When the main battery is fully charged, it can power the computer (with Pentium M 1.6 GHz / 15-inch UXGA LCD / 6,600 mAh battery) for the following duration:

- Power ON about 2.3 hours (Normal Mode)
 about 5.3 hours (When BWS Battery Mark is running)
 about 5.0 hours (When Mobile Mark is running)

1.9.2 Battery LED (Main Battery)

The battery LED displays the status of the battery pack. The battery LED on the computer displays the status of the main battery.

- Orange Main battery is charging. (with AC Adaptor)
- Green Main battery is fully charged. (with AC Adaptor)
- Orange / Flashing Power ON (without AC Adaptor)
 Main battery charge is low.
- LED Off Any other condition

1.9.3 Battery Charging Control

Battery charging is controlled by a power supply microprocessor mounted on the system board. The power supply microprocessor controls whether the charge is on or off and detects a full charge when the AC adaptor and battery are attached to the computer. The system charges the battery using quick charge or trickle charge.

❑ Battery Charge

When the AC adaptor is attached, battery charge starts.

The times required for quick charges are listed in Table 1-8.

Table 1-8 Time required for quick charges

Status	Charging time
Power off	about 3 hours
Power on	6 to 16 hours or longer (6600 mAh model)

NOTES

The time required for quick charge when power is on is affected by the amount of power the system is consuming. Use of the fluorescent lamp and frequent disk access consumes power and lengthens the charge time.

If any of the following occurs, the battery charge stops.

1. The battery becomes fully charged.
2. The AC adaptor or battery is removed.
3. The AC adaptor or battery voltage is abnormal
4. The charging current is abnormal.

❑ Detection of full charge

A full charge is detected when the battery is charging, and under any of the following conditions:

1. The battery charging current drops under the predetermined limit.
2. The charging time exceeds the limit.
3. The battery's temperature exceeds 60°C.

1.9.4 RTC battery

The RTC battery provides power to keep the current date, time and other setup information in memory while the computer is turned off. Table 1-9 lists the charging time and data preservation period of the RTC battery. The adapter or main battery charges the RTC battery, while the computer is powered on.

Table 1-9 RTC battery charging/data preservation time

Status	Time
Charging Time (power on)	8 hours or longer
Data preservation period (full charge)	1 month or longer

Chapter 2

Troubleshooting Procedures

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2.1 Troubleshooting

Chapter 2 describes how to determine if a Field Replaceable Unit (FRU) in the computer is causing the computer to malfunction. The FRUs covered are:

- | | | |
|----------------------|-----------------------|---------------------|
| 1. System Board | 5. Display | 9. Sound components |
| 2. Floppy Disk Drive | 6. Optical Disk Drive | 10. Bluetooth |
| 3. Hard Disk Drive | 7. Modem | 11. Wireless LAN |
| 4. Keyboard | 8. LAN | |

The Diagnostics Disk operations are described in Chapter 3. Detailed replacement procedures are given in Chapter 4.

The following tools are necessary for implementing the troubleshooting procedures:

1. Diagnostics Disk
2. Phillips screwdriver (2 mm)
3. Toshiba MS-DOS system disk(s)
(You must install the following onto the disk: SYS.COM, FORMAT.COM, FDISK.COM and FDISK.EXE)
4. 2DD or 2HD formatted work disk for floppy disk drive testing
5. Cleaning kit for floppy disk drive troubleshooting
6. Cleaning kit for DVD-ROM and CD-RW/DVD-ROM troubleshooting
7. Printer port LED
8. Printer port wrap around connector
9. PC Card wrap around card
10. Multimeter
11. External monitor
12. PS/2 or compatible keyboard
13. PS/2 or compatible mouse
14. Multimedia sound system with line-in and line-out ports
15. Headphone
16. Microphone
17. USB test module and USB cable
18. TOSHIBA CD-ROM TEST DISK (ZA1217P01/P000204190)
19. DVD-ROM TSD-1 (TOSHIBA EMI DVD Test Media)

20. CD-RW media that supports four-speed writing and is formatted with DirectCD (media manufactured by RICOH or Mitsubishi Chemical are recommended).
21. RJ11 connector checker and modular cable or RJ11 connector checker LED
22. LAN wraparound connector
23. Music CD
24. DVD that isn't a test media

2.2 Troubleshooting Flowchart

Use the flowchart in Figure 2-1 as a guide for determining which troubleshooting procedures to execute. Before going through the flowchart steps, verify the following:

- Ask the user if a password is registered and, if it is, ask him or her to enter the password. If the user has forgotten the system password, perform the following procedure at the appropriate step in the flowchart in Figure 2-1:

Connect the printer port wraparound board (F31PRT), then turn the POWER switch on. The computer will override the password function by erasing the current password.

- Verify with the customer that TOSHIBA Windows XP is installed on the hard disk. Operating systems that were not preinstalled by TOSHIBA can cause the computer to malfunction.
- Make sure all optional equipment is removed from the computer.
- Make sure the floppy disk drive is empty.

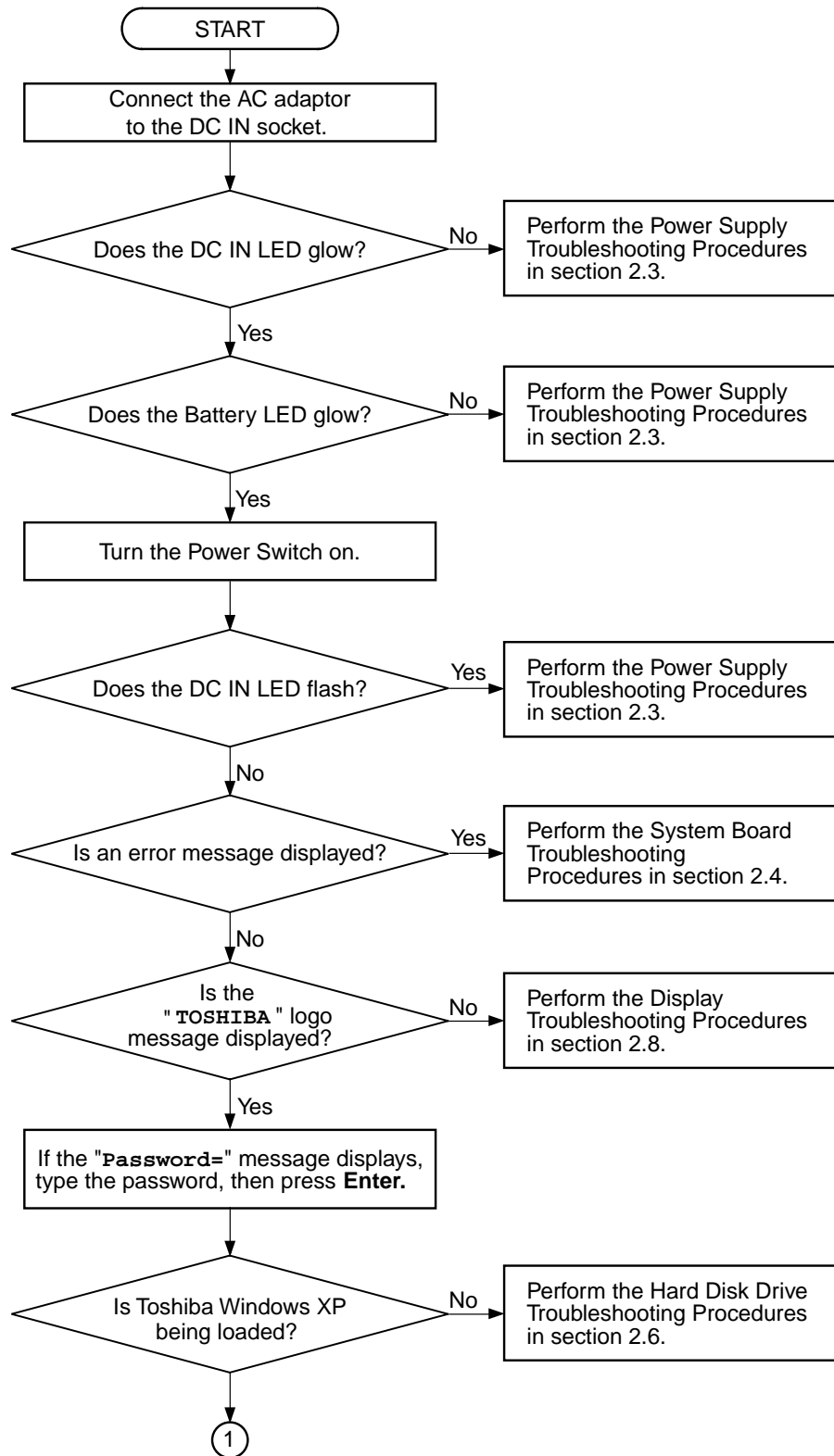


Figure 2-1 Troubleshooting flowchart (1/2)

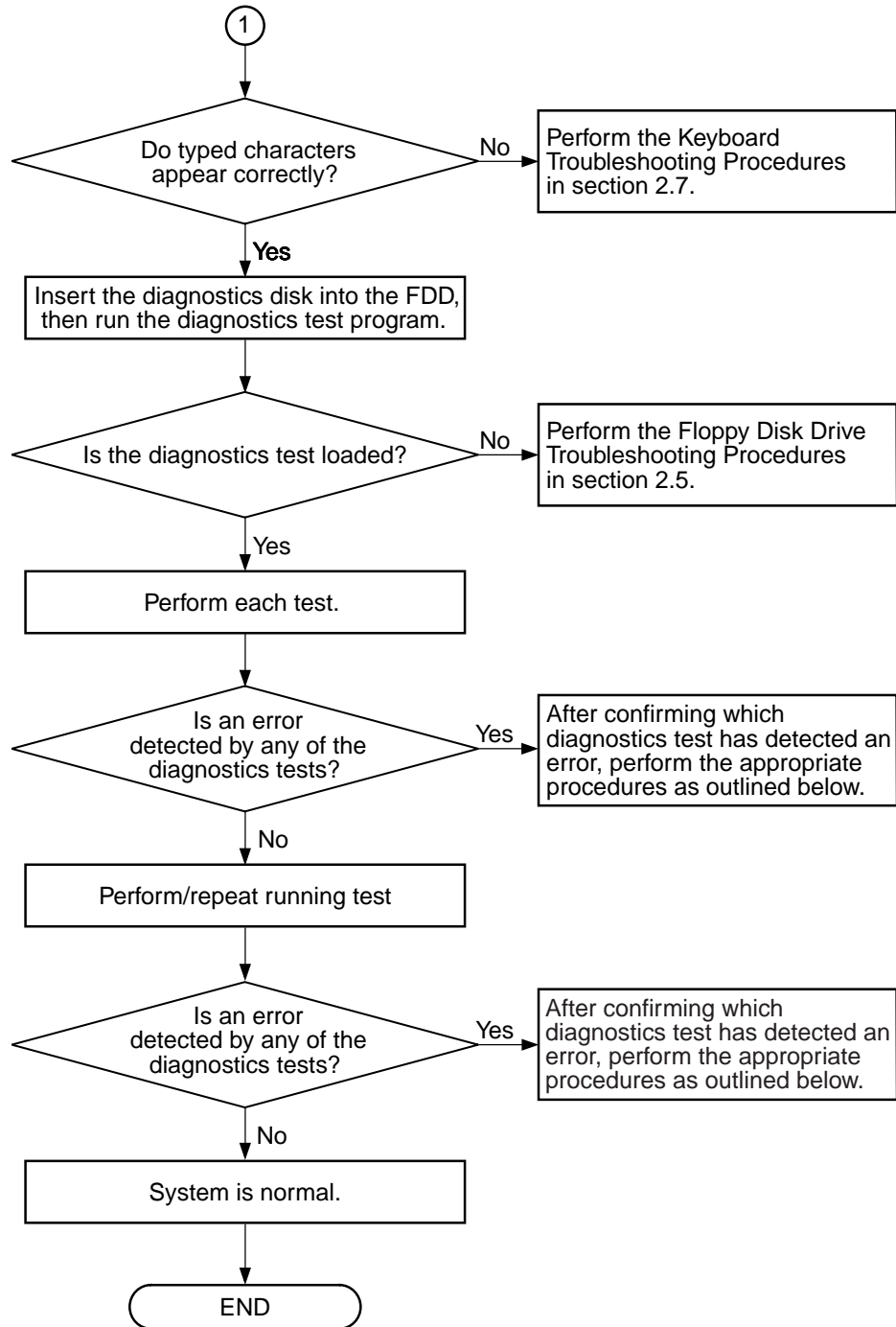


Figure 2-1 Troubleshooting flowchart (2/2)

If the diagnostics program cannot detect an error, the problem may be intermittent. The Running Test program should be executed several times to isolate the problem. Check the Log Utilities function to confirm which diagnostic test detected an error, then perform the appropriate troubleshooting procedures as follows:

1. If an error is detected by the system test, memory test, printer test, expansion test or real timer test, perform the System Board Troubleshooting Procedures in Section 2.4.
2. If an error is detected by the floppy disk test, perform the FDD Troubleshooting Procedures in Section 2.5.
3. If an error is detected by the hard disk test, perform the HDD Troubleshooting Procedures in Section 2.6.
4. If an error is detected by the keyboard test, perform the Keyboard Troubleshooting Procedures in Section 2.7.
5. If an error is detected by the display test, perform the Display Troubleshooting Procedures in Section 2.8.
6. If an error is detected by the CD-ROM/DVD-ROM test, perform the Optical Disk Drive Troubleshooting Procedures in Section 2.9.
7. If an error is detected by the Modem test, perform the Modem/LAN Troubleshooting Procedures in Section 2.10 or the LAN Troubleshooting Procedures in Section 2.11.
8. If an error is detected by the Sound test, perform the Sound Troubleshooting Procedures in Section 2.12.

2.3 Power Supply Troubleshooting

The power supply controls many functions and components. To determine if the power supply is functioning properly, start with Procedure 1 and continue with the other Procedures as instructed. The procedures described in this section are:

Procedure 1: Power Status Check

Procedure 2: Error Code Check

Procedure 3: Connection Check

Procedure 4: Quick Charge Check

Procedure 5: Replacement Check

Procedure 1 Power Status Check

The following LEDs indicate the power supply status:

Battery LED

DC IN LED

The power supply controller displays the power supply status through the Battery and the DC IN LEDs as listed in the tables below.

Table 2-1 Battery LED

Battery LED	Power supply status
Lights orange	Quick charge
Lights green	Battery is fully charged and AC adaptor is connected
Blinks orange (even intervals)	The battery level becomes low while operating the computer on battery power.*1
Flashes orange	The power switch is pressed on when the battery level is low.*2
Doesn't light	Any condition other than those above.

*1 Low Battery Hibernation will be executed soon.

*2 Low Battery Hibernation has already been executed.

Table 2-2 DC IN LED

DC IN LED	Power supply status
Lights green	DC power is being supplied from the AC adaptor.
Blinks orange	Power supply malfunction *3
Doesn't light	Any condition other than those above.

*3 When the power supply controller detects a malfunction, the DC IN LED blinks and an error code is displayed.

To check the power supply status, install a battery pack and connect an AC adaptor.

Check 1 If the DC IN LED blinks orange, go to Procedure 2.

Check 2 If the DC IN LED does not light, go to Procedure 3.

Check 3 If the battery LED does not light orange or green, go to Procedure 4.

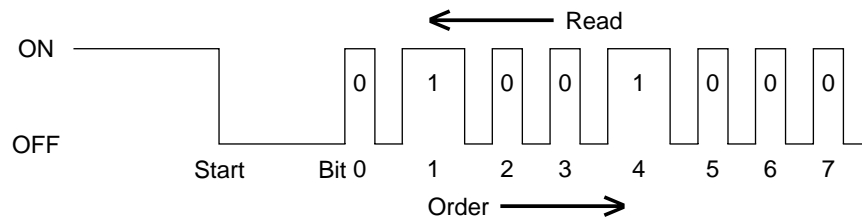
Procedure 2 Error Code Check

If the power supply microprocessor detects a malfunction, the DC IN LED blinks orange. The blink pattern indicates an error as shown below.

- Start Off for 2 seconds
- Error code (8 bit)
 - “1” On for one second
 - “0” On for a half second
 - Interval between data bits Off for a half second

The error code begins with the least significant digit.

Example: Error code 12h (Error codes are given in hexadecimal format.)



Check 1 Convert the DC IN LED blink pattern into the hexadecimal error code and compare it to the tables below.

- DC IN

Error code	Meaning
10h	AC Adaptor output voltage is more than 16.5 V.
11h	Advanced Port Replicator II output voltage is more than 16.5 V.
12h	Current from the DC power supply is more than the limit (6.05 A).
13h	Current from the DC power supply is more than the limit (0.5 A) when there is no load.
14h	Current sensing IC is not normal.

❑ 1st Battery

Error code	Meaning
20h	Main battery overvoltage is detected. (Not supported)
21h	Main battery charge current is more than 6.05 A.
22h	Main battery discharge current is more than 0.5 A when there is no load.
23h	Main battery charge current is more than 4.3 A when DC IN direct charge is off.
24h	Current sensing IC is not normal.
25h	Main battery charge current is more than 0.3A when the battery isn't being charged.

❑ 2nd Battery

Error code	Meaning
30h	2nd battery overvoltage is detected. (Not supported)
31h	2nd battery charge current is more than 6.05 A.
32h	2nd battery discharge current is more than 0.5 A when there is no load.
33h	2nd battery charge current is more than 3.1 A when DC IN direct charge is off.
34h	Current sensing IC is not normal.
35h	2nd battery charge current is more than 0.3A when the battery isn't being charged.

❑ S3V output

Error code	Meaning
40h	S3V voltage is under or equal to 3.14V when the computer is turned on or off.
45h	S3V voltage is under or equal to 3.14V when the computer is booting up.

❑ 1R5-C1V output

Error code	Meaning
50h	1R5-C1V voltage is over 1.80V when the computer is powered on or off.
51h	1R5-C1V voltage is less than 1.275V when the computer is powered on.
52h	1R5-C1V voltage is less than 1.275V when the computer is booting up.
53h	1R5-C1V voltage is less than 1.275V when the computer is suspended.
54h	1R5-C1V voltage is abnormal when the computer is shutting down.
55h	1R5-C1V voltage is less than 1.275V when the computer is booting up.

❑ 1R8-C1V output

Error code	Meaning
60h	1R8-C1V voltage is over 2.16V when the computer is powered on or off.
61h	1R8-C1V voltage is less than 1.53V when the computer is powered on.
62h	1R8-C1V voltage is less than 1.53V when the computer is booting up.
63h	1R8-C1V voltage is less than 1.53V when the computer is suspended.
64h	1R8-C1V voltage is abnormal when the computer is shutting down.
65h	1R8-C1V voltage is less than 1.53V when the computer is booting up.

❑ PPV output

Error code	Meaning
70h	PPV voltage is over 1.80V when the computer is powered on or off.
71h	PPV voltage is less than 0.56V when the computer is powered on.
72h	PPV voltage is less than 0.56V when the computer is booting up.
73h	PPV voltage is over or equal to 0.56V when the computer is powered off.

❑ BGVSNS-B1P output

Error code	Meaning
80h	BGVSNS-B1P voltage is over 1.62V when the computer is powered on or off.
81h	BGVSNS-B1P voltage is less than 0.68V when the computer is powered on.
82h	BGVSNS-B1P voltage is less than 0.68V when the computer is booting up.
83h	BGVSNS-B1P voltage is more than 0.68V when the computer is powered off.
84h	BGVSNS-B1P voltage is less than 0.68V when the computer is suspended.

❑ E5V output

Error code	Meaning
90h	E5V voltage is more than 6.00V when the computer is powered on or off.
91h	E5V voltage is less than 4.50V when the computer is powered on.
92h	E5V voltage is less than 4.50V when the computer is booting up.
93h	E5V voltage is more than 4.50V when the computer is powered off.
94h	E5V voltage is less than 4.50V when the computer is suspended.

❑ E3V output

Error code	Meaning
A0h	E3V voltage is more than 3.96V when the computer is powered on or off.
A1h	E3V voltage is less than 2.81V when the computer is powered on.
A2h	E3V voltage is less than 2.81V when the computer is booting up.
A3h	E3V voltage is more than 2.81V when the computer is powered off.
A4h	E3V voltage is less than 2.81V when the computer is suspended.

❑ 1R2-P1V output

Error code	Meaning
B0h	1R2-P1V voltage is more than 1.44V when the computer is powered on or off.
B1h	1R2-P1V voltage is less than 1.02V when the computer is powered on.
B2h	1R2-P1V voltage is less than 1.02V when the computer is booting up.
B3h	1R2-P1V voltage is more than 1.02V when the computer is powered off.

❑ 2R5-B2V output

Error code	Meaning
C0h	2R5-B2V voltage is more than 3.00V when the computer is powered on or off.
C1h	2R5-B2V voltage is less than 2.125V when the computer is powered on.
C2h	2R5-B2V voltage is less than 2.125V when the computer is booting up.
C3h	2R5-B2V voltage is more than 2.125V when the computer is powered off.
C4h	2R5-B2V voltage is less than 2.125V when the computer is suspended.

❑ 1R25-P1V output

Error code	Meaning
D0h	1R25-P1V voltage is more than 1.50V when the computer is powered on or off.
D1h	1R25-P1V voltage is less than 1.063V when the computer is powered on.
D2h	1R25-P1V voltage is less than 1.063V when the computer is booting up.
D3h	1R25-P1V voltage is more than 1.063V when the computer is powered off.
D4h	1R25-P1V voltage is less than 1.063V when the computer is suspended.

❑ 2R5-B2V output

Error code	Meaning
E0h	2R5-B2V voltage is more than 3.00V when the computer is powered on or off.
E1h	2R5-B2V voltage is less than 2.125V when the computer is powered on.
E2h	2R5-B2V voltage is less than 2.125V when the computer is booting up.
E3h	2R5-B2V voltage is more than 2.125V when the computer is powered off.
E4h	2R5-B2V voltage is less than 2.125V when the computer is suspended.

Check 2 In the case of error code 10h or 12h:

- Make sure the AC adaptor cord and AC power cord are firmly plugged into the DC IN 15 V socket and wall outlet. If the cables are connected correctly, go to the following step:
- Connect a new AC adaptor and/or AC power cord, if necessary. If the error still exists, go to Procedure 5.

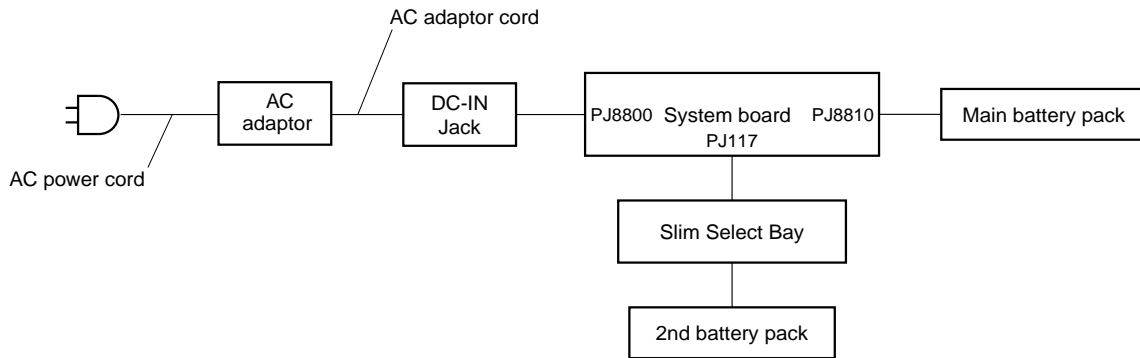
Check 3 In the case of error code 2Xh or 3Xh:

- Make sure the battery pack is correctly installed in the computer. If the battery pack is correctly installed, go to the following step:
- Replace the battery pack with a new one. If the error still exists, go to Procedure 5.

Check 4 Any other error is occurred, go to Procedure 5.

Procedure 3 Connection Check

The power supply wiring diagram is shown below:



Any of the connectors may be disconnected. Perform Check 1.

Check 1 Disconnect the AC power cord from wall outlet. Check the power cable for breaks. If the power cord is damaged, connect a new AC power cord. If there is no damage, go to Check 2.

Check 2 Make sure the AC adaptor cord and AC power cord are firmly plugged into the DC IN 15 V jack, AC adaptor inlet and wall outlet. If these cables are connected correctly, go to Check 3.

Check 3 Make sure that the DC IN jack is firmly secured to the system board.

- If the DC IN jack is loose, go to Procedure 5.
- If it is not loose, go to Check 4.

Check 4 Use a multimeter to make sure that the AC adaptor output voltage is close to 15 V. If the output is several percent lower than 15 V, go to Check 5. If the output is close to 15 V, go to Check 6.

Check 5 Connect a new AC adaptor or AC power cord.

- If the DC IN LED does not light, go to Procedure 5.
- If the battery LED does not light, go to Check 6.

Check 6 Make sure the battery pack is installed in the computer correctly. If the battery is properly installed and the battery LED still does not light, go to Procedure 4.

Procedure 4 Quick Charge Check

The power supply may not charge the battery pack. Perform the following procedures:

1. Reinstall the battery pack.
2. Attach the AC adaptor and turn on the power. If you cannot turn on the power, go to Procedure 5.
3. Run the Diagnostic test, go to System test and execute subtest 06 (quick charge) described in Chapter 3.
4. When quick charge is complete, the diagnostics test displays the result code. Check the result code against the table below and perform any necessary check.

Result code	Contents	Check items
0	The battery is quick charging normally.	Normal
1	The battery is fully charged.	Normal
2	The AC adaptor is not attached.	Check 1
3	The AC adaptor's output voltage is not normal.	Check 1
4	The Battery is not installed.	Check 2
5	The battery's output voltage is not normal.	Check 3
6	The battery's temperature is not normal.	Check 4
7	A bad battery is installed.	Check 2
8	Any other problems.	Check 5

- Check 1 Make sure the AC adaptor and AC power cord are firmly plugged into the DC IN socket and the wall outlet. If these cables are connected correctly, replace the AC adaptor (and/or AC power cord, if necessary).
- Check 2 Make sure the battery is properly installed. If the battery is properly installed, go to Check 3.
- Check 3 The battery pack may be completely discharged. Wait a few minutes to charge the battery pack. If the battery pack is still not charged, go to Check 4.
- Check 4 The battery's temperature is too hot or cold. Return the temperature to a normal operating condition. If the battery pack still is not charged, go to Check 5.
- Check 5 Replace the battery pack with a new one. If the battery pack still is not charged, go to Procedure 5.

Procedure 5 Replacement Check

The system board may be disconnected or damaged. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures*, and perform the following Check 1:

- Check 1 Replace the AC adaptor with a new one. If the AC adaptor is still not functioning properly, perform Check 2.
- Check 2 Use a multimeter to make sure that F8800, F8801, F8810 and F8820 fuses on the system board are not blown. If none of them are blown, go to Check 3. If any fuses are blown, replace the system board with a new one following the instructions in Chapter 4.
- Check 3 The system board may be damaged. Replace it with a new one following the instructions in Chapter 4.

2.4 System Board Troubleshooting

This section describes how to determine if the system board is defective or not functioning properly. Start with Procedure 1 and continue with the other procedures as instructed. The procedures described in this section are:

Procedure 1: Message Check

Procedure 2: Printer Port LED Check on Boot Mode

Procedure 3: Diagnostic Test Program Execution Check

Procedure 4: Replacement Check

Procedure 1 Message Check

When the power is turned on, the system performs the Initial Reliability Test (IRT) installed in the BIOS ROM. The IRT tests each IC on the system board and initializes it.

- If an error message is shown on the display, perform Check 1.
- If there is no error message, go to Procedure 2.
- If TOSHIBA MS-DOS or TOSHIBA Windows XP is properly loaded, go to Procedure 3.

Check 1 If one of the following error messages displays on the screen, press the **F1** key as the message instructs. These errors occur when the system configuration preserved in the RTC memory (CMOS type memory) is not the same as the actual configuration or when the data is lost.

If you press the **F1** key as the message instructs, the TSETUP screen appears to set the system configuration. If error message (b) appears often when the power is turned on, replace the RTC battery. If any other error message displays, perform Check 2.

- (a) *** Bad HDD type ***
Check system. Then press [F1] key
- (b) *** Bad RTC battery ***
Check system. Then press [F1] key
- (c) *** Bad configuration ***
Check system. Then press [F1] key
- (d) *** Bad memory size ***
Check system. Then press [F1] key
- (e) *** Bad time function ***
Check system. Then press [F1] key
- (f) *** Bad check sum (CMOS) ***
Check system. Then press [F1] key
- (g) *** Bad check sum (ROM) ***
Check system. Then press [F1] key

Check 2 The IRT checks the system board. When the IRT detects an error, the system stops or an error message appears.

If one of the following error messages (1) through (17), (24) or (25) displays, go to Procedure 4.

If error message (18) displays, go to the Keyboard Troubleshooting Procedures in Section 2.7.

If error message (19) or (20) displays, go to the HDD Troubleshooting Procedures in Section 2.6.

If error message (21) displays, go to the Optical Disk Drive Troubleshooting Procedures in Section 2.9.

If error message (22) or (23) displays, go to the FDD Troubleshooting Procedures in Section 2.5.

- (1) PIT ERROR
- (2) MEMORY REFRESH ERROR
- (3) TIMER CH.2 OUT ERROR
- (4) CMOS CHECKSUM ERROR
- (5) CMOS BAD BATTERY ERROR
- (6) FIRST 64KB MEMORY ERROR
- (7) FIRST 64KB MEMORY PARITY ERROR
- (8) VRAM ERROR
- (9) SYSTEM MEMORY ERROR
- (10) SYSTEM MEMORY PARITY ERROR
- (11) EXTENDED MEMORY ERROR
- (12) EXTENDED MEMORY PARITY ERROR
- (13) DMA PAGE REGISTER ERROR
- (14) DMAC #1 ERROR
- (15) DMAC #2 ERROR
- (16) PIC #1 ERROR
- (17) PIC #2 ERROR
- (18) KBC ERROR
- (19) HDC ERROR
- (20) IDE #0 ERROR
- (21) IDE #1 ERROR
- (22) NO FDD ERROR
- (23) FDC ERROR
- (24) TIMER INTERRUPT ERROR
- (25) RTC UPDATE ERROR

Procedure 2 Printer Port LED Check on Boot Mode

The printer port LED displays the IRT status and test status by turning lights on and off as an eight-digit binary value for boot mode. Figure 2-2 shows the printer port LED.

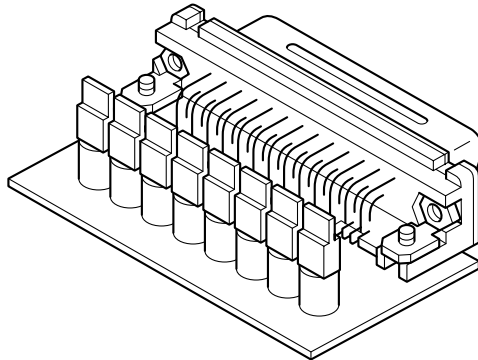


Figure 2-2 Printer port LED

To use the printer port LED follow the steps below:

1. Plug the printer port LED into the computer's parallel port.
2. Turn on the computer's power.
3. Read the LED status from left to right as you are facing the back of the computer.
4. Convert the status from binary to hexadecimal notation.
5. If the final LED status is FFh (normal status), go to Procedure 3.
6. If the final LED status matches any of the test status values in Table 2-3, perform Check 1.

NOTE: *If an error condition is detected by the IRT test, the printer port LED displays an error code after the IRT test ends. For example, when the printer port LED displays 19h and halts, the IRT test has already completed the Display initialization. In this instance, the IRT indicates an error has been detected during the Display logo.*

Table 2-3 Printer port LED boot mode status (1/6)

LED Status	Test item	Message
FFh	Start	Register initialization for boot block
B0h	Flash ROM check	PIT ch.0 initialization
		BIOS rewrite flag initialization
		Transition to protected mode
		Boot block checksum
		Checksum check except boot block
B1h	EC/KBC rewrite check	KBC initialization
B2h	BIOS rewrite check	BIOS rewrite request check
B3h	System BIOS rewrite transition to IRT	System BIOS rewrite transition to IRT
	BIOS rewrite process	BIOS rewrite register initialization
		PIT channel 1 initialization
		PIT, DMAC,PIC initialization
		Memory type check
		Cache bus, L2 initialization, configuration
		Enabling L1 cache
		Memory clear
Protecting flash ROM area cache		
B7h	FDC interruption	Enabling FDC interruption
		HW debug
		Display initialization
B8h	Sound control initialization	Sound controller initialization (for beep)
		Message display
		Key input
		Reading CHGBIOS.EXE
00h	IRT Check system	IRT Check system
		Protecting cache
		Special register, Intel® chip set initialization
		PIT channel 1 initialization
01h	Memory check	DRAM type and size check
02h	SM-RAM stack area test	SM-RAM stack area test
03h	CMOS check and initialization	Enabling L1 cache
		CMOS access test

Table 2-3 Printer port LED boot mode status (2/6)

LED Status	Test item	Message
		CMOS battery level check
		CMOS checksum
		CMOS data initialization (1)
		Set IRT status
		DRAM size storing in CMOS
04h	Resume branch	Resume branch check
		SM-RAM checksum
		SMI control flag clear
		System BIOS RAM area checksum
		Wake Up check
		SMRAM base rewrite
		PnP RAM checksum
		PIT test and initialization
06h	Grant SMI	Enabling SMI except for auto-off function
		Set clock generator
		ACPI register initialization
		Initialization of temperature control information
		EC debug
		Piano debug
		443BX device 1 initialization
		PIC register initialization
07h	Resume process	Resume process to resume main
		Resume error process
	System BIOS ROM/RAM copy	440BX debug
		AGP bridge initialization
		System BIOS ROM to RAM copy
05h	SMRAM initialization	SMRAM initialization
		Wake Up check
		SMRAM base rewrite and BIOS CPU state map store
		Set SMI handler to runtime
		PIT test and initialization
06h	CPU clock measure	CPU clock measure

Table 2-3 Printer port LED boot mode status (3/6)

LED Status	Test item	Message
D0h	Grant SMI (1)	Set SMI table for CPU clock measure
		Grant SMI (1)
D1h	Operating clock measure	Operating clock measure
		Set SMI table
D2h	Grant SMI (2)	Grant SMI (2)
		Set clock generator
		Initialization of temperature control information
D3h	EC, piano debug	EC, Piano debug
D4h	Alarm power-on date check	Alarm power-on date check
D5h	Read EC version	Read EC version
		CMOS default setup check
		ACPI table initialization
		KBC initialization
07h	VGA initialization	VGA display off and reset control
	Sound initialization	Sound controller initialization
	Modem initialization	Modem reset power down release process
	Get multi-box status	Get multi-box status
70h	PCI initialization	PCI initialization
		PCI test
		CPU type check
		Check if self test is required
		Password initialization
74h	Wake Up check	Wait for LAN controller reset completion
		Wake Up check
		Instant security start check
75h	PCI bus initialization	PCI bus initialization (DS bus connect)
71h	CMOS initialization	CMOS data initialization (2)
		Flash ROM type update
		PnP initialization
72h	PnP ISA card reset	PnP ISA card reset

Table 2-3 Printer port LED boot mode status (4/6)

LED Status	Test item	Message
73h	SETUP	Set SETUP item
		Wait for VGA EC access process completion
		Power-off switch check
		EC wake up conditions clear
		Set processing speed
		System speaker volume control (Beep)
		Set low battery alarm
		Set panel close alarm
76h		Set panel power On / Off mode
		Wait for getting multi-box status
77h	Serial port initialization Modem initialization Serial interrupt control PC Card Slot initialization Automatic configuration work	H/W configuration from PnP resource
		Serial port initialization
		Modem initialization
		Serial interrupt control
		PC Card Slot initialization
		Automatic configuration work
81h		Reserved resource map configuration
		Set reserved display resource to resource map
82h		Set reserved resource to resource map
83h	HDD initialization FDD initialization	Wait for VGA power-up
		PCI device open and vender ID rewrite
		Wait for Modem initialization completion
		PCI automatic configuration
		Wait for PCI automatic configuration completion
		Set printer port
		HDD initialization
		FDD initialization
78h	MPEG initialization	MPEG initialization
		HC (PIIX4 func 2) initialization and USB device recognition/Initialization
		IRQ routing table update
		P6 micro-code update
79h		Wait for VGA power-on

Table 2-3 Printer port LED boot mode status (5/6)

LED Status	Test item	Message
08h	Output code generation	Output code generation
09h	First 64KB memory check	First 64KB memory check
0Ah	Interrupting vector initialization	Interrupting vector initialization
0Dh	NDP initialization	NDP initialization
18h	System initialization	Store CMOS error information to SMRAM
		Timer initialization
		Read power supply system information
		System BIOS update
		Set DRAM windows to Horn X from extended limit
		Grant SMI from docking port and multi box
19h	Display initialization	VGA BIOS initialization
1Fh	Display logo	Display logo
20h	PnP isolation	PnP card isolation
	System memory check	Conventional memory check
	System memory initialization	Conventional memory initialization
25h	Extension memory check	Extension memory check
30h	DMA page check	DMA page check
40h	DMAC check	DMAC check
41h	DMAC initialization	DMAC initialization (Boot)
22h	DMAC initialization	DMAC initialization (Reboot)
42h	Printer check	Printer check
70h	SIO check	SIO check
80h	Boot password	Password check
		Wait for KBC initialization process completion
81h	FDD initialization	Wait for FDD initialization process completion
82h	HDD initialization	Wait for HDD initialization process completion
83h		IRT key input check
		ATA priority initialization
		Password input
		Wait for KBC / Mouse initialization completion

Table 2-3 Printer port LED boot mode status (6/6)

LED Status	Test item	Message
C0h	PnP configuration	PCI IRQ configuration
		PnP ISA card configuration
C1h	Extention I/O ROM check	Extention I/O ROM check
A6h	Pre boot SETUP	Store 40 : 00h value (for SIQ save / restore)
		Set font address for resume password
		Set USB/KB repeat parameter
		T shadow RAM size store
		Extended memory store in CMOS
		System source update
		DMI table update
		INT 15h E820h function memory map rewrite
		DMI wake up update and SM-BIOS structure table update
		ACPI table update
		MMI mask release
		Wait for PSC version writing on BIOS
		TIT checksum
		Runtime IRT flag clear
		Runtime checksum update
		Hibernation branch
		CPU,HDD upgrade check
		Set battery save mode
		Set date
		Close PCI device configuration area
Cache control		
Wait for serial port initialization completion		
Runtime checksum update		
Set thermal duty		
FFH	End	

Check 1 If any of the following error codes display, go to Procedure 4.

B0h, B1h, B2h, B3h, B7h, B8h, 00h, 01h, 02h, 03h, 04h, 06h, 07h, 05h, D0h, D1h, D2h, D3h, D4h, D5h, 70h, 74h, 75h, 71h, 72h, 73h, 76h, 77h, 81h, 82h, 83h, 78h, 79h, 08h, 09h, 0Ah, 0Dh, 18h, 19h, 1Fh, 20h, 25h, 30h, 40h, 41h, 22h, 42h, 80h, 83h, C0h, C1h, A6h

Check 2 If error codes 81h or 82h are displayed, go to the following sections:

Section 2.5 FDD Troubleshooting

Section 2.6 HDD Troubleshooting

Procedure 3 Diagnostic Test Program Execution Check

Execute the following tests from the Diagnostic Test Menu. Refer to Chapter 3, *Tests and Diagnostics*, for more information on how to perform these tests.

1. System test
2. Memory test
3. Keyboard test
4. Display test
5. Floppy Disk test
6. Printer test
7. Hard Disk test
8. Real Timer test
9. NDP test
10. Expansion test
11. Sound test
12. CD-ROM/DVD-ROM test
13. Modem test

If an error is detected during these tests, go to Procedure 4.

Procedure 4 Replacement Check

The system board connectors may be damaged. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures* and perform Check 1.

Check 1 Visually check for the following conditions:

- a) Connector housing is cracked or broken.
- b) Connector pins are damaged.
 - If there is damage, go to Check 2
 - If there is no damage, but an error message still appears, go to Check 2.

Check 2 The system board may be damaged. Replace the system board with a new one.

2.5 FDD Troubleshooting

This section describes how to determine if the FDD is functioning properly. Perform the steps below starting with Procedure 1 and continuing with the other procedures as required.

Procedure 1: FDD Head Cleaning Check

Procedure 2: Diagnostic Test Program Execution Check

Procedure 3: Connector Check and Replacement Check

Procedure 1 FDD Head Cleaning Check

FDD head cleaning is one option available in the Diagnostic Program. A detailed operation is given in Chapter 3, *Tests and Diagnostics*.

Insert the Diagnostics Disk in the computer's floppy disk drive, turn on the computer and run the test. Clean the FDD heads using the cleaning kit. If the FDD still does not function properly after cleaning, go to Procedure 3.

If the test program cannot be executed on the computer, go to Procedure 3.

Procedure 2 Diagnostic Test Program Execution Check

Insert the Diagnostics Disk in the FDD, turn on the computer and run the test. Refer to Chapter 3, *Tests and Diagnostics*, for more information about the diagnostics test procedures.

Floppy disk drive test error codes and their status names are listed in Table 2-4. Make sure the floppy disk is formatted correctly and that the write protect tab is disabled. If any other errors occur while executing the FDD diagnostics test, go to Check 1.

Table 2-4 FDD error code and status

Code	Status
01h	Bad command
02h	Address mark not found
03h	Write protected
04h	Record not found
06h	Media removed on dual attach card
08h	DMA overrun error
09h	DMA boundary error
10h	CRC error
20h	FDC error
40h	Seek error
60h	FDD not drive
80h	Time out error (Not ready)
EEh	Write buffer error
FFh	Data compare error

Check 1 If the following message displays, disable the write protect tab on the floppy disk. If any other message appears, perform Check 2.

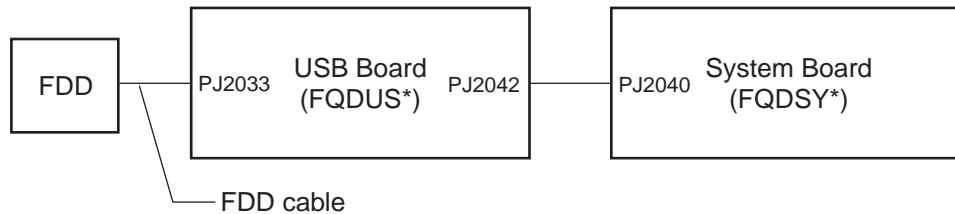
Write protected

Check 2 Make sure the floppy disk is formatted correctly. If it is, go to Procedure 3.

Procedure 3 Connector Check and Replacement Check

The 3.5-inch FDD is connected to the USB board.

- Check 1 Make sure that the FDD cable is firmly connected to the USB port, and that the USB board is firmly connected to the system board.



If any of the connections are loose, reconnect firmly and repeat Procedure 2. If any of the connections is damaged, or there is still an error, go to Check 2.

- Check 2 The FDD or FDD cable may be defective or damaged. Replace it with a new one and repeat Procedure 2. If the FDD is still not functioning properly, perform Check 3.
- Check 3 The USB board may be defective or damaged. Replace it with a new one following the steps described in Chapter 4, *Replacement Procedures*. If the FDD is still not functioning properly, go to Check 4.
- Check 4 Replace the System board with a new one following the steps in Chapter 4.

2.6 HDD Troubleshooting

This section describes how to determine if the HDD is functioning properly. Perform the steps below starting with Procedure 1 and continuing with the other procedures as required.

Procedure 1: Message Check

Procedure 2: Partition Check

Procedure 3: Format Check

Procedure 4: Diagnostic Test Program Execution Check

Procedure 5: Connector Check and Replacement Check

CAUTION: *The contents of the hard disk will be erased when the HDD troubleshooting procedures are executed. Transfer the contents of the hard disk to floppy disks or other storage drive(s).*

Procedure 1 Message Check

When the computer's HDD does not function properly, some of the following error messages may appear on the display. Start with Check 1 below and perform the other checks as instructed.

Check 1 If any of the following messages appear, go to Procedure 5. If the following messages do not appear, perform Check 2.

HDC ERROR (After 5 seconds this message will disappear.)
or

IDE #0 ERROR (After 5 seconds this message will disappear.)

Check 2 If either of the following messages appears, go to Procedure 2. If the following messages do not appear, perform Check 3.

Insert system disk in drive
Press any key when ready

or

Non-System disk or disk error
Replace and press any key

Check 3 Check TSETUP to see whether the Hard Disk option is set to Not used. If it is set to Not used, choose another setting and restart the computer. If the problem still exists, go to Procedure 2.

Procedure 2 Partition Check

Insert the TOSHIBA MS-DOS system disk and restart the computer. Perform the following checks:

- Check 1 Type **C:** and press **Enter**. If you cannot change to drive C, go to Check 2. If you can change to drive C, go to Check 3.
- Check 2 Type **FDISK** and press **Enter**. Choose Display Partition Information from the FDISK menu. If drive C is listed, go to Check 3. If drive C is not listed, return to the FDISK menu and choose the option to create a DOS partition on drive C. Restart the computer from the TOSHIBA MS-DOS system disk. If the problem still exists, go to Procedure 3.
- Check 3 If drive C is listed as active in the FDISK menu, go to Check 4. If drive C is not listed as active, return to the FDISK menu and choose the option to set the active partition for drive C. Restart the computer. If the problem still exists, go to Check 4.
- Check 4 Type **DIR C:** and press **Enter**. If the following message displays, go to Procedure 3. If contents of drive C are listed on the display, go to Check 5.

```
Invalid media type reading drive C
Abort, Retry, Fail?
```

- Check 5 Using the **SYS** command on the TOSHIBA MS-DOS system disk, install system files on the HDD.

If the following message appears on the display, the system files have been transferred to the HDD. Restart the computer. If the problem still exists, go to Procedure 3.

```
System transferred
```


Procedure 3 Format Check

The computer's HDD is formatted using the MS-DOS FORMAT program. To format the HDD, follow the steps below.

Check 1 Format the HDD and transfer system files using **FORMAT C:/S/U**. If the following message appears on the display, the HDD is formatted.

Format complete

If an error message appears on the display, go to Procedure 4.

Procedure 4 Diagnostic Test Program Execution Check

The HDD test program is stored in the diagnostics disk. Perform all of the HDD tests in the Hard Disk Drive Test. Refer to Chapter 3, *Tests and Diagnostics*, for more information about the HDD test program.

If an error is detected during the HDD test, an error code and status will be displayed. The error codes and statuses are listed in Table 2-5. If an error code is not generated and the problem still exists, go to Procedure 5.

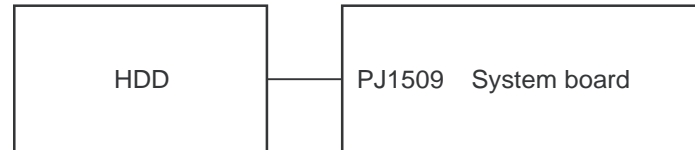
Table 2-5 Hard disk drive error code and status

Code	Status
01h	Bad command
02h	Bad address mark
04h	Record not found
05h	HDC not reset
07h	Drive not initialized
08h	HDC overrun (DRQ)
09h	DMA boundary error
0Ah	Bad sector error
0Bh	Bad track error
10h	ECC error
11h	ECC recover enable
20h	HDC error
40h	Seek error
80h	Time out error
AAh	Drive not ready
BBh	Undefined error
CCh	Write fault
E0h	Status error
EEh	Access time out error
DAh	No HDD

Procedure 5 Connector Check and Replacement Check

The HDD or the system board may be disconnected or damaged. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures* and perform the following checks:

Check 1 Make sure the HDD is firmly connected to PJ1509 on the system board.



If the connections are loose, reconnect firmly and repeat Procedure 1. If there is still an error, go to Check 2.

Check 2 The HDD may be damaged. Replace it with a new one following the instructions in Chapter 4. If the problem still exists, perform Check 3.

Check 3 The system board may be damaged. Replace it with a new one following the instructions in Chapter 4.

2.7 Keyboard Troubleshooting

To determine if the computer's keyboard is functioning properly, perform the following procedures. Start with Procedure 1 and continue with the other procedures as instructed.

Procedure 1: External Keyboard Check

Procedure 2: Diagnostic Test Program Execution Check

Procedure 3: Connector and Replacement Check

Procedure 1 External Keyboard Check

Connect a USB keyboard to the computer's USB port, then boot the computer. The computer automatically detects the external keyboard.

If the external keyboard works correctly, the internal keyboard may be damaged. Go to Procedure 3.

If the external keyboard appears to have the same problem as the internal keyboard, the system board may be damaged. Go to Procedure 2.

Procedure 2 Diagnostic Test Program Execution Check

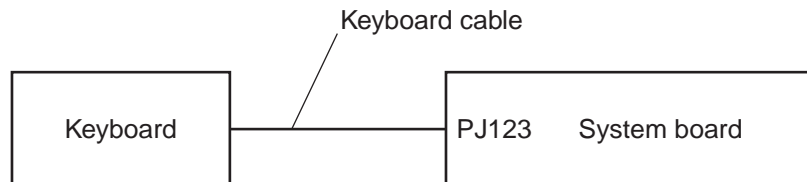
Execute the Keyboard Test in the Diagnostic Program. Refer to Chapter 3, *Tests and Diagnostics* for more information on how to perform the test program.

If an error occurs, go to Procedure 3. If an error does not occur, the keyboard is functioning properly.

Procedure 3 Connector and Replacement Check

The keyboard, Touch pad, switch board or system board may be disconnected or damaged. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures* and perform the following checks. If the keyboard malfunctions, start with Check 1. If the Touch pad malfunctions, start with Check 3. If the switch board malfunctions, start with Check 5.

Check 1 Make sure the keyboard cable is firmly connected to the system board.

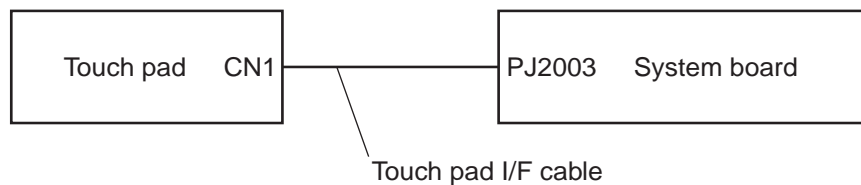


If the connection is loose, reconnect firmly and repeat Procedure 2. If there is still an error, go to Check 2.

Check 2 The keyboard may be damaged. Replace it with a new one following the instructions in Chapter 4.

If the problem still exists, perform Check 7.

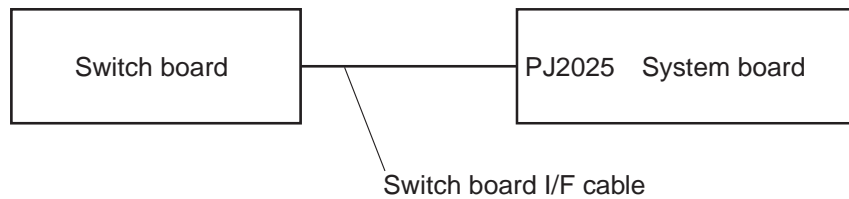
Check 3 Make sure the Touch pad I/F cable is firmly connected to the system board and to the Touch pad.



If the connections are loose, reconnect firmly and repeat Procedure 1. If there is still an error, go to Check 4.

Check 4 The Touch pad or the I/F cable may be damaged. Replace them with new ones following the instructions in Chapter 4. If the problem still exists, perform Check 7.

- Check 5 Make sure the switch board I/F cable is firmly connected to the system board and to the switch board.



If any of the connections are loose, reconnect firmly and repeat Procedure 1. If there is still an error, go to Check 6.

- Check 6 The switch board or the I/F cable may be damaged. Replace them with new ones following the instructions in Chapter 4. If the problem still exists, perform Check 7.
- Check 7 The system board may be damaged. Replace it with a new one following the instructions in Chapter 4.

2.8 Display Troubleshooting

This section describes how to determine if the computer's display is functioning properly. Start with Procedure 1 and continue with the other procedures as instructed.

Procedure 1: External Monitor Check

Procedure 2: Diagnostic Test Program Execution Check

Procedure 3: Connector and Replacement Check

Procedure 1 External Monitor Check

Connect an external monitor to the computer's external monitor port, then boot the computer. The computer automatically detects the external monitor.

If the external monitor works correctly, the internal LCD may be damaged. Go to Procedure 3.

If the external monitor appears to have the same problem as the internal monitor, the system board may be damaged. Go to Procedure 2.

Procedure 2 Diagnostic Test Program Execution Check

The Display Test program is stored on the computer's Diagnostics disk. This program checks the display controller on the system board. Insert the Diagnostics disk in the computer's floppy disk drive, turn on the computer and run the test. Refer to Chapter 3, *Tests and Diagnostics* for details.

If an error is detected, go to Procedure 3. If an error is not detected, the display is functioning properly.

Procedure 3 Connector and Replacement Check

The FL, FL inverter board, LCD module, and system board are connected to the display circuits. Any of these components may be damaged. Refer to Chapter 4, *Replacement Procedures*, for instructions on how to disassemble the computer and then perform the following checks:

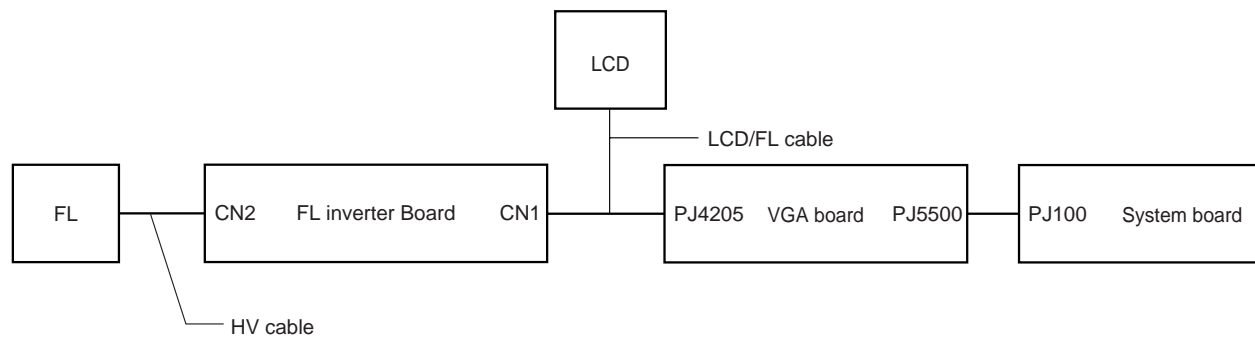
If the FL does not light, perform Check 1.

If characters or graphics are not displayed clearly, perform Check 3.

If some screen functions do not operate properly, perform Check3.

If the FL remains lit when the display is closed, perform Check4.

Check 1 Replace the FL inverter board with a new one and test display again. If the problem still exists, perform Check 2.



Check 2 Replace the FL with a new one and test the display again. If the problem still exists, perform Check3.

Check 3 Replace the LCD module with a new one and test display again. If the problem still exists, perform Check 4.

Check 4 Replace the LCD/FL cable with a new one and test display again. If the problem still exists, perform Check 5.

Check 5 Replace the VGA board with a new one and test display again. If the problem still exists, perform Check 6.

Check 6 The system board may be damaged. Replace it with a new one.

2.9 Optical Disk Drive Troubleshooting

This section describes how to determine if the computer's internal optical disk drive (CD-R/RW drive, DVD-ROM drive, Multi drive, DVD-R/-RW drive or DVD-RAM drive) is functioning properly. Perform the steps below starting with Procedure 1 and continue with the other procedures as required.

Procedure 1: Drive Cleaning Check

Procedure 2: Diagnostic Test Program Execution Check

Procedure 3: Connector Check and Replacement Check

Procedure 1 Drive Cleaning Check

1. Turn off the power to the computer.
2. Open the CD/DVD drawer by inserting a slender object such as a straightened paper clip into the eject hole. The object must be long enough to activate the eject mechanism.
3. Clean the laser pickup lens with a lens cleaner. Apply the cleaner to a cloth and wipe the lens.
4. If the drive still does not function properly after cleaning, go to Procedure 2.

Procedure 2 Diagnostic Test Program Execution Check

The CD-ROM/DVD-ROM test program is stored in the Diagnostics Disk.

For the DVD-ROM test, prepare a test DVD (TOSHIBA-EMI DVD-ROM Test Media TSD-1).

For the CD-RW test, use CD-RW media that supports four-speed writing (media manufactured by RICOH or Mitsubishi Chemical are recommended).

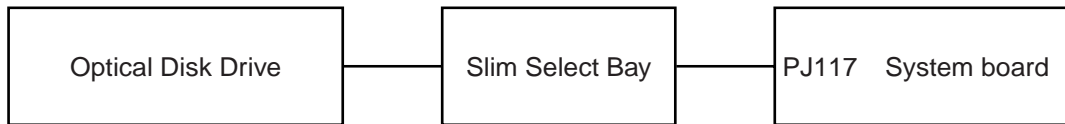
Then insert the Diagnostics Disk in the computer's floppy disk drive, turn on the computer and run the test. Refer to Chapter 3, *Tests and Diagnostics*, for more information about the diagnostics test procedures.

If any errors occur while executing the CD-ROM/DVD-ROM test, go to Procedure 3.

Procedure 3 Connector Check and Replacement Check

The optical disk drive is installed in the system board. The drive may be disconnected, or the drive or system board may be damaged. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures* and perform the following checks:

Check 1 Make sure the drive is properly installed in the Slim Select Bay of the computer.



If the drive have not been properly installed, install it properly and repeat Procedure 2. If there is still an error, go to Check 2.

Check 2 The drive may be defective or damaged. Replace the drive with a new one following the steps in Chapter 4, *Replacement Procedures*. If the drive is still not functioning properly, perform Check 3.

Check 3 The Slim Select Bay or the system board may be damaged. Replace them with new ones following the instructions in Chapter 4, *Replacement Procedures*.

2.10 Modem Troubleshooting

This section describes how to determine if the computer's modem is functioning properly. Perform the steps below starting with Procedure 1 and continuing with the other procedures as required.

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connector Check and Replacement Check

Procedure 1 Diagnostic Test Program Execution Check

The modem Diagnostic test program is stored on the computer's diagnostic disk. Insert the diagnostics disk in the computer's floppy disk drive, turn the computer on and run the test. Refer to Chapter 3, *Tests and Diagnostics*, for details.

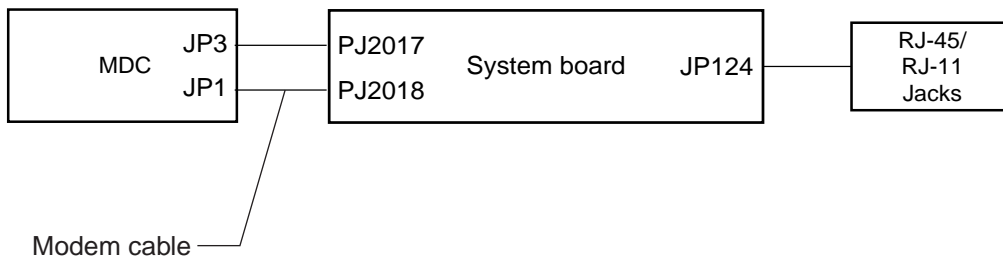
If an error occurs while executing the modem diagnostics test, go to Procedure 2.

Procedure 2 Connector Check and Replacement Check

The Modem is installed as a modem daughter card (MDC). If the modem malfunctions, there may be a bad connection between the MDC and the system board. Or the MDC, the system board or their connectors might be damaged.

Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures* and perform the following checks:

- Check 1 Make sure the MDC is firmly connected to system board PJ2017 and PJ2018, and the RJ-45/RJ-11 Jack is firmly connected to system board JP124.



If any connectors are disconnected, connect them firmly and repeat Procedure 1. If the Modem is still not functioning properly, perform Check 2.

- Check 2 The RJ-45/RJ-11 jacks may be defective or damaged. Replace it with a new one following the steps in Chapter 4, *Replacement Procedures*. If the modem is still not functioning properly, perform Check 3.
- Check 3 The MDC or the modem cable may be defective or damaged. Replace them with new ones following the steps in Chapter 4, *Replacement Procedures*. If the modem is still not functioning properly, perform Check 4.
- Check 4 The system board may be defective or damaged. Replace the System Board with a new one following the steps in Chapter 4, *Replacement Procedures*.

2.11 LAN Troubleshooting

This section describes how to determine if the computer's LAN port is functioning properly. Perform the steps below starting with Procedure 1 and continuing with the other procedure as required.

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connector Check and Replacement Check

Procedure 1 Diagnostic Test Program Execution Check

The LAN Diagnostic test program is stored on the computer's diagnostic disk. This program checks the LAN function. Insert the diagnostics disk in the computer's floppy disk drive, turn the computer on and run the test. Refer to Chapter 3, *Tests and Diagnostics*, for details.

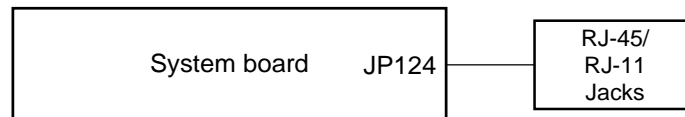
If an error occurs while executing the LAN diagnostics test, go to Procedure 2.

Procedure 2 Connector Check and Replacement Check

If the LAN port malfunctions, there may be a bad connection between the RJ-45/RJ-11 jacks and the System Board. Or the System Board may be damaged.

Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures* and perform the following checks:

Check 1 Make sure the RJ-45/RJ-11 jacks are firmly connected to system board JP124.



If a connector is disconnected, connect it firmly and repeat Procedure 1. If the LAN port is still not functioning properly, perform Check 2.

Check 2 The RJ-45/RJ-11 jacks may be defective or damaged. Replace it with a new one following the steps in Chapter 4, *Replacement Procedures*. If the LAN port is still not functioning properly, perform Check 3.

Check 3 The system board may be defective or damaged. Replace the system board with a new one following the steps in Chapter 4, *Replacement Procedures*.

2.12 Sound Troubleshooting

This section describes how to determine if the computer's sound functions are functioning properly. Perform the steps below starting with Procedure 1 and continuing with the other procedures as required.

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connector Check

Procedure 3: Replacement Check

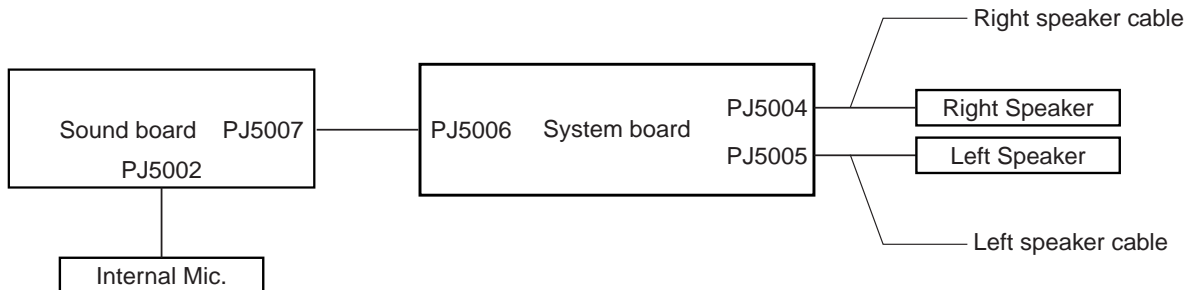
Procedure 1 Diagnostic Test Program Execution Check

The sound test program is stored on the computer's diagnostic disk. Insert the Diagnostics disk in the computer's floppy disk drive, turn on the computer and run the test. Refer to Chapter 3, *Tests and Diagnostics*, for details.

If an error is detected, go to Procedure 2.

Procedure 2 Connector Check

The sound function wiring diagram is shown below:



Any of the connections may be disconnected. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures* and perform the following checks:

If the stereo speakers don't work correctly, perform Check 1.

If the internal microphone doesn't work correctly, perform Check 2

If headphones or the external microphone doesn't work correctly, perform Check 3.

- Check 1** If the stereo speakers don't sound properly, the speaker cables may be disconnected. Make sure the speaker cables are firmly connected to PJ5004 and PJ5005 on the system board. If the stereo speakers still aren't functioning properly, go to Procedure 3.
- Check 2** If the internal microphone doesn't work properly, the internal microphone cable may be disconnected. Make sure the internal microphone cable is firmly connected to PJ5002 on the system board. If the internal microphone still isn't functioning properly, go to Check 3.
- Check 3** The sound board be disconnected. Make sure the sound board is firmly connected to PJ5006 on the system board. If the sound functions still aren't functioning properly, go to Procedure 3.

Procedure 3 Replacement Check

- Check 1 If the stereo speakers don't sound properly, the stereo speakers may be defective or damaged. Replace them with new ones. If the stereo speakers still do not work properly, go to Check 3.
- Check 2 If the internal microphone does not work correctly, the internal microphone may be defective or damaged. Replace it with a new one. If the internal microphone still does not work correctly, go to Check 3.
- Check 3 The sound board may be defective or damaged. Replace it with a new one. If sound functions still do not work correctly, go to Check 4.
- Check 4 The system board may be defective or damaged. Replace it with a new one.

2.13 Bluetooth Troubleshooting

This section describes how to determine if the computer's Bluetooth functions are working properly. Perform the steps below starting with Procedure 1 and continuing with the other procedure as required.

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connector Check and Replacement Check

Procedure 1 Diagnostic Test Program Execution Check

Make sure the wireless communication switch on the front side of the computer is turned on. If it is not, slide the switch toward the right to turn it on.

The Bluetooth Diagnostic test program is stored on the computer's diagnostic disk. This program checks the Bluetooth function. Insert the diagnostics disk in the floppy disk drive, turn the computer on and run the test. Refer to Chapter 3, *Tests and Diagnostics*, for details.

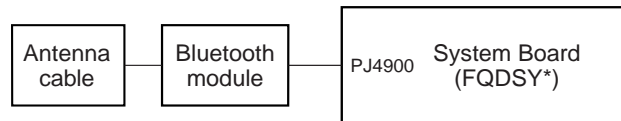
If an error occurs while executing the Bluetooth diagnostics test, go to Procedure 2.

Procedure 2 Connector Check and Replacement Check

If the Bluetooth function malfunctions, there may be a bad connection between the antenna cable, the Bluetooth module, and the system board (FQDSY*). Or the antenna cable or other boards may be damaged.

Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures* and perform the following checks:

- Check 1 The Bluetooth function wiring diagram is shown below. Make sure all of the connections are firmly connected.



- If any of the connectors are disconnected, connect it firmly and repeat Procedure 1. If the Bluetooth still isn't functioning properly, perform Check 2.
- Check 2 The antenna coaxial cable may be defective or damaged. Replace it with a new one following the steps in Chapter 4, *Replacement Procedures*. If the Bluetooth is still not functioning properly, perform Check 3.
- Check 3 The Bluetooth module may be defective or damaged. Replace it with a new one following the steps in Chapter 4, *Replacement Procedures*. If the Bluetooth is still not functioning properly, perform Check 4.
- Check 4 The system board (FQDSY*) may be defective or damaged. Replace the System board with a new one following the steps in Chapter 4, *Replacement Procedures*.

2.14 Wireless LAN Troubleshooting

This section describes how to determine if the computer's Wireless LAN is functioning properly. Perform the steps below starting with Procedure 1 and continuing with the other procedure as required.

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connector Check and Replacement Check

Procedure 1 Diagnostic Test Program Execution Check

Make sure the wireless communication switch on the front side of the computer is turned on. If it is not, slide the switch toward the right to turn it on.

The Wireless LAN Diagnostic test program is stored on the computer's diagnostic disk. This program checks the Wireless LAN function. Insert the diagnostics disk in the external floppy disk drive which is connected to a USB port of the computer, turn the computer on and run the test. Refer to Chapter 3, *Tests and Diagnostics*, for details.

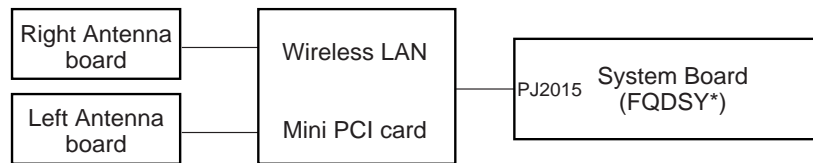
If an error occurs while executing the Wireless LAN diagnostics test, go to Procedure 2.

Procedure 2 Connector Check and Replacement Check

If the Wireless LAN port malfunctions, there may be a bad connection between the antenna boards, the Wireless LAN Mini PCI card, and the system board (FQDSY*). Or the antenna board, the Mini PCI card, or the system board may be damaged.

Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures* and perform the following checks:

- Check 1 Make sure that the Wireless LAN Mini PCI card is properly installed in the Mini PCI slot, and that the right and left antenna cable is firmly connected to the Mini PCI card.



If any connectors are disconnected, connect it firmly and repeat Procedure 1. If the Wireless LAN is still not functioning properly, perform Check 2.

- Check 2 The antennas may be defective or damaged. Replace them with new ones following the steps in Chapter 4, *Replacement Procedures*. If the wireless LAN still isn't functioning properly, perform Check 3.
- Check 4 The wireless LAN mini PCI card may be defective or damaged. Replace it with a new one following the steps in Chapter 4, *Replacement Procedures*. If the wireless LAN still isn't functioning properly, perform Check 5.
- Check 5 The system board (FQDSY*) may be defective or damaged. Replace the system board with a new one following the steps in Chapter 4, *Replacement Procedures*.

Chapter 3

Tests and Diagnostics

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3.1 The Diagnostic Test

This chapter explains how to use the Diagnostic Test program to test the functions of the computer's hardware modules. The Diagnostic Test Program is stored on the Diagnostic Disk. The Diagnostic Test program consists of eight programs that are grouped into the Service Program Module (DIAGNOSTIC TEST MENU).

NOTE: To start the diagnostics, follow these steps:

1. Check all cables for loose connections.
2. Exit any application you may be using and close Windows.

The DIAGNOSTIC MENU consists of the following eight functions.

- DIAGNOSTIC TEST
- HEAD CLEANING
- LOG UTILITIES
- RUNNING TEST
- FDD UTILITIES
- SYSTEM CONFIGURATION
- EXIT TO MS-DOS
- SETUP

The DIAGNOSTIC TEST MENU contains the following twelve functional tests:

- SYSTEM TEST
- MEMORY TEST
- KEYBOARD TEST
- DISPLAY TEST
- PRINTER TEST
- ASYNC TEST
- HARD DISK TEST
- REAL TIMER TEST
- NDP TEST
- EXPANSION TEST
- CD-ROM/DVD-ROM TEST
- LAN

Other tests as follows

- WIRELESS LAN (Agere) TEST
- WIRELESS LAN (Atheros) TEST
- SOUND/LAN/MODEM TEST
- IEEE1394 TEST
- BLUETOOTH TEST

You will need the following equipment to perform some of the Diagnostic test programs.

- The Diagnostics Disk (all tests)
- A formatted working disk for the floppy disk drive test
- An external FDD attachment
- A cleaning kit to clean the floppy disk drive heads (Head Cleaning)
- A cleaning kit to clean the DVD-ROM drive heads (Head Cleaning)
- A PC card wraparound connector for the I/O card test (Expansion test) (Rev.B or higher)
- A printer wraparound connector for the printer wraparound test (Printer test)
- A CD test media (TOSHIBA CD-ROM TEST DISK ZA1217P01/P000204190) (CD-ROM/DVD-ROM test)
- A DVD test media (Toshiba-EMI DVD-ROM TEST DISK TSD-1) (CD-ROM/DVD-ROM test)
- CD-RW media that supports four-speed writing (media manufactured by RICOH or Mitsubishi Chemical are recommended.)
- External CRT (Display test)
- Headphone (Sound test)
- CD-ROM drive (CD-ROM test)
- A microphone
- A modular cable and RJ11 connector checker
- A modular cable and RJ11 connector checker (LED)
- USB test module and USB cable
- LAN wraparound connector
- Music CD (CD-ROM/DVD-ROM test)

The following sections detail the tests within the Diagnostic Test function of the DIAGNOSTIC TEST MENU. Refer to Sections 3.23 through 3.28 for detailed information on the remaining Service Program Module functions.

3.2 Executing the Diagnostic Test

Toshiba MS-DOS is required to run the DIAGNOSTICS TEST PROGRAM. To start the DIAGNOSTIC TEST PROGRAM, follow these steps:

1. Insert the Diagnostics disk in the floppy disk drive and turn on the computer while pressing **U**.
(The Diagnostics Disk contains the MS-DOS boot files.)

NOTE: To execute the CD-ROM or DVD-ROM test, make sure the CD-ROM and CD-ROM drive or DVD-ROM and DVD-ROM drive is installed in the computer.

The following menu will appear:

```
TOSHIBA Personal Computer  xxxxxxxx DIAGNOSTICS
Version X.XX (C) Copyright TOSHIBA Corp. XXXX
```

DIAGNOSTICS MENU :

```
1 - DIAGNOSTIC TEST
2 -
3 -
4 - HEAD CLEANING
5 - LOG UTILITIES
6 - RUNNNING TEST
7 - FDD UTILITIES
8 - SYSTEM CONFIGURATION
9 - EXIT TO MS-DOS
0 - SETUP
```

```
↑↓← : Select items
Enter: Specify
Esc  : Exit
```

NOTE: To exit the DIAGNOSTIC TEST MENU, press **Esc**. If a test program is in progress, press **Ctrl + Break** to exit the test program, or press **Ctrl + C** to stop the test program.

2. To execute the DIAGNOSTIC TEST MENU from the DIAGNOSTICS MENU, set the highlight bar to **1**, and press **Enter**. The following DIAGNOSTIC TEST MENU will appear:

```
TOSHIBA Personal Computer  xxxxxxxx DIAGNOSTICS
Version X.XX (C) Copyright TOSHIBA Corp. XXXX
```

```
DIAGNOSTICS MENU :
```

```
1 - SYSTEM TEST
2 - MEMORY TEST
3 - KEYBOARD TEST
4 - DISPLAY TEST
5 -
6 - PRINTER TEST
7 - ASYNC TEST
8 - HARD DISK TEST
9 - REAL TIMER TEST
10 - NDP TEST
11 - EXPANSION TEST
12 -
13 - CD-ROM/DVD-ROM TEST
14 - LAN TEST
88 - ERROR RETRY COUNT SET  [ FDD & HDD ]
99 - EXIT TO DIAGNOSTICS MENU
```

```
↑↓↔ : Select items
Enter: Specify
Esc  : Exit
```

Refer to sections 3.4 through 3.15 for detailed descriptions of each Diagnostic Tests 1 through 13. Function 88 sets the floppy disk drive and hard disk drive error retry count. Function 99 exits the submenus of the Diagnostic Test and returns to the Diagnostic Menu.

3. Select the option you want to execute and press **Enter**. When “1-SYSTEM TEST” is selected, the following message will appear:

```

SYSTEM TEST                XXXXXXXX
                             xxxxxxxx DIAGNOSTIC TEST VX.XX
                             [Ctrl]+[Break] : test end
                             [Ctrl]+[C]    : key stop

SUB-TEST   : XX
PASS COUNT: XXXXX   ERROR COUNT: XXXXX
WRITE DATA: XX     READ DATA : XX
ADDRESS   : XXXXX   STATUS      : XXX

SUB-TEST MENU :

01 - ROM checksum
02 - Dock/Undock
03 -
04 - Fan ON/OFF
05 - Geyserville
06 - Quick charge
07 - DMI read
08 - DMI write
09 -
10 - CPU Temperature
99 - Exit to DIAGNOSTIC TEST MENU

                                ↑↓↔ : Select items
                                Enter: Specify
                                Esc  : Exit

```

NOTE: *The menu displayed by your computer may be slightly different from the one shown above.*

4. Select the desired subtest number from the subtest menu and press **Enter**. The following message will appear:

```
TEST LOOP : YES/NO
```

Selecting **YES** increases the pass counter by one, each time the test cycle ends and restarts the test cycle.

Selecting **NO** returns the subtest menu to the main menu after the test is complete.

5. The following message will appear:

```
ERROR STOP : YES/NO
```

Then, use the left or right arrow keys to move the cursor to the desired option and press **Enter**.

Selecting **YES** stops the test program when an error is found and displays the operation guide on the right side of the display screen as shown below:

```
ERROR STATUS NAME    [[ HALT OPERATION ]]  
  
1: Test end  
2: Continue  
3: Retry
```

These three selections have the following functions respectively:

1. Terminates the test program and exits to the subtest menu.
2. Continues the test.
3. Restarts the test from the error.

Selecting **NO** keeps the test running even if an error is found.

6. Use the arrow keys to move the cursor to the desired option and press **Enter**.

Table 3-1 in section 3.3 describes the function of each test on the subtest menu. Table 3-4 in section 3.21 describes the error codes and error status for each error.

3.3 Subtest Names

Table 3-1 lists the subtest names for each test program in the DIAGNOSTIC TEST MENU.

Table 3-1 Subtest names (1/3)

No.	Test Name	Subtest No.	Subtest Name
1	SYSTEM	01	ROM checksum
		02	Dock/Undock
		04	Fan ON/OFF
		05	Geyserville
		06	Quick charge
		07	DMI read
		08	DMI write
		10	CPU Temperature
2	MEMORY	01	Conventional memory
		02	Protected mode
		04	Cache memory
		05	L2 cache memory
		06	Stress
		06	Stress
3	KEYBOARD	01	Pressed key display
		02	Pressed key code display
		03	PS/2 Mouse connect check
		04	Touch Pad
		05	USB (Port0,Port1) test
		06	USB (Port2,Port3) test
		07	Button test
		08	IPS
4	DISPLAY	01	VRAM read/write for VGA
		02	Gradation for VGA
		03	Gradation for LCD
		04	Gradation & Mode test for VGA
		05	All dot on / off for LCD
		06	"H" pattern display
		07	LCD Brightness
6	PRINTER	01	Ripple pattern
		02	Function
		03	Wrap around

Table 3-1 Subtest names (2/3)

No.	Test Name	Subtest No.	Subtest Name		
7	ASYNC	01	Wrap around (board)		
		02	Point to Point (send)		
		03	Point to Point (receive)		
		04	Interrupt test		
		06	FIR/SIR Point to point (send)		
		07	FIR/SIR Point to point (receive)		
		8	HARD DISK	01	Sequential read
02	Address uniqueness				
03	Random address/data				
04	Cross talk & peak shift				
06	Write specified address				
07	Read specified address				
09	Sequential write				
10	W-R-C specified address				
9	REAL TIMER			01	Real time
				02	Backup memory
		03	Real time carry		
10	NDP	01	NDP test		
11	EXPANSION	01	PCMCIA Wrap around		
		03	RGB monitor ID		
13	CD-ROM/DVD-ROM	01	Sequential read		
		02	Read specified address		
		03	Random address/data		
		04	Playback music		
		07	RW 1point W/R/C		
14	LAN	01	LAN MAC address display		

Table 3-1 Subtest names (3/3)

No.	Test Name	Subtest No.	Subtest Name
-	Wireless LAN (Agere)	1	Transmit & Receive test [Responder]
		2	MAC Address test [Mini-PCI Wireless LAN]
		3	Wireless LAN (WEP64/128) test
		0	Transmit & Receive test [Initiator]
-	Wireless LAN (Atheros)	1	Test PC [Initiator]
		0	[Responder]
-	SOUND/ LAN/ MODEM	1	Microphone recording & play
		2	Sin wave
		3	LAN
		4	Modem
-	IEEE1394	1	IEEE1394 test
		2	Responder test
		3	ID check
-	Bluetooth	1	BD_ADDR check
		2	Communication test

3.4 System Test

To execute the System Test select **1** from the DIAGNOSTIC TEST MENU, press **Enter** and follow the directions on the screen. Move the highlight bar to the subtest you want to execute and press **Enter**.

Subtest 01 ROM Checksum

This subtest executes a checksum test of the BIOS ROM on the System Board.

Subtest 02 Dock/Undock

Subtest 04 Fan On/Off

This subtest checks CPU fan operation using the on/off command. The following message will appear when this subtest is executed. Make sure the fan does not rotate and press **Enter**.

```
Test Fan Revolution 0000RPM Start
```

The following message will appear. Make sure the fan rotates at low speed and press **Enter**.

```
Test Fan Revolution Low Speed Start
```

The following message will appear. Make sure the fan rotates at high speed and press **Enter**.

```
Test Fan Revolution High Speed Start
```

Subtest 05 Geyserville

This Subtest checks that the CPU operating clock speed can be correctly changed.

Subtest 06 Quick charge

This subtest checks the status for the quick charge.

Subtest 07 DMI read

Reads the factory setting for the serial and DMI numbers.

```

Model Name           : XXXXXX
Version Number      : XXXXXX-XXXXX
Serial Number       : XXXXXXXXXXXX
Model Number        : XXXXXX-XXXXX
PCN/BND Number      : XXXXXXXXXXXXXXXXXXXXXXXX
UUID Number         : XXXXXXXXXXXXXXXXXXXXXXXX

```

To exit this subtest and return to the SYSTEM TEST menu, press Enter.

Subtest 08 DMI write

The following messages appear in order. When this subtest is executed. Input each information. (If you do not replace the PCB, the DMI information should not be changed.)

1. "Enter Model Name ?" is displayed.

Input the computer's model name and press **Enter**. (e.g. DynaBook Satellite)

2. "Enter Version Number ?"

Input the computer's version number and press **Enter**. (e.g. PS245U-AAA13)

3. "Enter Serial Number ?"

Input the computer's serial number and press **Enter**. (e.g. Z2020855JU)

4. "Enter Model Number ?"

Input the computer's sales model number and press **Enter**. (e.g. PS245U-AAA13)

5. "Enter Bundle Number ?"

Input the computer's PCN/Bundle number and press **Enter**. (e.g. PCN1190CCZ01/S3A1320D990)

6. "Write data OK (Y/N) ?"

When **Y** is press, the DMI information is written to the Flash-ROM.

Subtest 10 CPU Temperature

This subtest measures the CPU temperature to see if the cooling functions of the computer are effectively working.

When the subtest starts, the following message appears on the display:

```
CPU TEMP = XX deg C   Throttling level = XXXXh
```

The number of the CPU TEMP indicates the CPU temperature at the moment in decimal notation. For example, if the number is 57, the CPU temperature is 57 degrees.

The number of “Throttling level” indicates how much the CPU has slowed. This number takes one of the following three values:

0000h : The CPU is running full speed.

4000h : The CPU has slowed to 75% of its maximum speed.

8000h : The CPU has slowed to 50% of its maximum speed.

The subtest displays the message five times at intervals of one minute; therefore, it takes five minutes to complete the test. The computer passes the test if the CPU temperature is less than 70 degrees at the end of the test. If the temperature is 70 degrees or more, the computer fails the test, and an error message appears on the display.

3.5 Memory Test

To execute the Memory Test, select **2** from the DIAGNOSTIC TEST MENU, press **Enter** and follow the directions on the screen. Move the highlight bar to the subtest you want to execute and press **Enter**.

Subtest 01 Conventional memory

This subtest writes constant data to conventional memory (0 to 640 KB), then reads the new data and compares the result with the original data.

Subtest 02 Protected Mode

NOTE: *The CONFIG.SYS file must be configured without expanded memory manager programs such as EMM386.EXE, EMM386.SYS or QEMM386.SYS. Also, the HIMEM.SYS must be deleted from the CONFIG.SYS file.*

This subtest writes constant data and address data to extended memory (maximum address 100000h) then reads the new data and compares the result with the original data.

The constant data is FFh, AAh, 55h, and 00h.

Subtest 04 Cache Memory

To test the cache memory, a pass-through write-read comparison of '5A' data is run repeatedly to the test area ('7000': 'Program' size to '7000': '7FFF' (32 KB)) to check the hit-miss ratio (on/off status) for CPU cache memory. One test takes 3 seconds.

Number of misses < Number of hits → OK

Number of misses ≥ Number of hits → Fail

Subtest 05 L2 Cache Memory

To test the L2 cache memory, a test similar to that for the cache memory is performed.

Subtest 06 Stress

The conventional memory is provided with a write/read buffer (size 1b30 h) and creates write data in the write buffer. Subsequent to 1 MB, the data is written in the write buffer and is read into the read buffer, followed by a data comparison up to the maximum memory size.

3.6 Keyboard Test

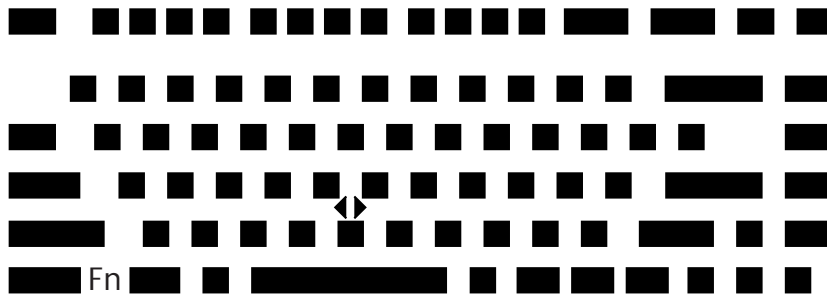
To execute the Keyboard Test, select **3** from the DIAGNOSTIC TEST MENU, press **Enter** and follow the directions on the screen. Move the highlight bar to the subtest you want to execute and press **Enter**.

Subtest 01 Pressed Key Display

***NOTE:** The Num **Lock** and the **Overlay** mode must be off to execute this subtest.*

When you execute this subtest, the keyboard layout is drawn on the display as shown below. When any key is pressed, the corresponding key on the screen changes to the key that was pressed. Holding a key down enables the auto-repeat function, which causes the key's display character to blink.

To exit this subtest, press **Del + Enter**



Subtest 02 Pressed Key Code Display

When a key is pressed, the scan code, character code, and key top name are displayed on the screen in the format shown below. The **Ins**, **Caps Lock**, **Num Lock**, **Scroll Lock**, **Alt**, **Ctrl**, **Left Shift**, and **Right Shift** keys are displayed in reverse screen mode when pressed. The scan codes, character codes, and key top names are shown in Appendix D.

```
KEYBOARD TEST  IN PROGRESS  302000
```

```
      Scan code      =
      Character code  =
      Keytop         =
```

```
Ins Lock   Caps Lock   Num Lock   Scroll Lock
Alt  Ctrl           Left Shift  Right Shift
```

```
PRESS [Enter] KEY
```

Subtest 03 PS/2 Mouse Connect Check

This subtest checks whether a PS/2 mouse is connected or not.

If this test does not detect an error, it returns to the subtest menu.

If this test detects an error, the following message appears:

```
DATA COMPARE ERROR
```

```
[ [ HALT OPERATION ] ]
```

```
1: Test end
2: Continue
3: Retry
```

Subtest 04 Touch Pad

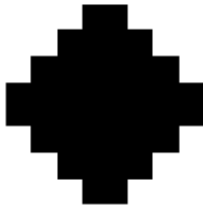
This Subtest checks the functions of the touch pad as shown below.

- A) Touch Pad pressure sensing direction and parameter.
- B) Touch Pad switch function check.

This test reports the pointing stick motion response from the touch pad and touch pad switch. When the touch pad is pressed towards the upper left, the <POINTING> display changes according to the following illustration. If a touch pad switch is pressed, the <BUTTON> (1) or (2) highlights. The parameters appear on the upper right of the display. To exit this subtest, press the two touch pad switches.

```
*** IPS (PAD) TEST (Vx.xx) ***
```

```
<POINTING>
```



```
<PARAMETER>
```

```
STATUS:0000h
```

```
X-RATE:0000h
```

```
Y-RATE:0000H
```

```
<BUTTON>
```

```
(1) (2)
```



```
<< PRESS BUTTON1+BUTTON2 THEN END >>
```

```
*** IPS (4-Btton) TEST (Vx.xx) ***
```

```
< POINTING >
```



```
<PARAMETER>
```

```
STATUS:0018h
```

```
X-RATE:OK
```

```
Y-RATE:OK
```

```
<BUTTON>
```

```
(1) (2)
```



```
<< PRESS BUTTON1+BUTTON2 THEN END >>
```

Subtest 05 USB Test (Port0,Port1) test

This Subtest checks USB. The USB TEST Module (ZD0003P01) and USB Cable (ZD0003P02) must be connected to the computer.

The following message will appear. Select a port to test and press **Enter**.

```
Test port number select (1:Port0, 2:Port1, 3:Port0&1) ?
```

If the test ends successfully, OK is displayed. If nothing is displayed, there may be a problem with the USB port. Check the wraparound connection and repeat the test.

To check only the USB mouse, follow the procedures below:

Connect the USB mouse to the computer's USB connector.

Next, set up the computer's hardware as follows:

```
PERIPHERAL
```

```
Pointing Devices = Simultaneous  
USB Legacy Emulation = Enabled
```

Then, perform the Pointing Stick Diagnostic Test and make sure:

- The cursor moves in the direction that you move the USB mouse.
- The display reverses when you click the right button or left button

To stop this test, press the two IPS buttons on the computer (connected to PJ10) at the same time. (You cannot use the USB mouse to stop the test.)

Subtest 06 USB Test (Port2,Port3) test

This Subtest checks USB. The USB TEST Module (ZD0003P01) and USB Cable (ZD0003P02) must be connected to the computer.

The following message will appear. Select a port to test and press **Enter**.

```
Test port number select (1:Port2, 2:Port3, 3:Port2&3) ?
```

If the test ends successfully, OK is displayed. If nothing is displayed, there may be a problem with the USB port. Check the wraparound connection and repeat the test.

Subtest 07 **Button Test**

When this subtest displays messages shown below in order, press the corresponding button.

NOTE: *This subtest must be completed within 10 seconds.*

Press [CD] button
Press [MP3] button
Press [Back] button
Press [Play] button
Press [Stop] button
Press [Next] button
Press [IE] button
Press [Mail] button
Press [TV] button

Subtest 08 **IPS**

This Subtest checks the functions of the accupoint. Follow the instructions of Subtest 04, with operating the accupoint instead of the touch pad.

3.7 Display Test

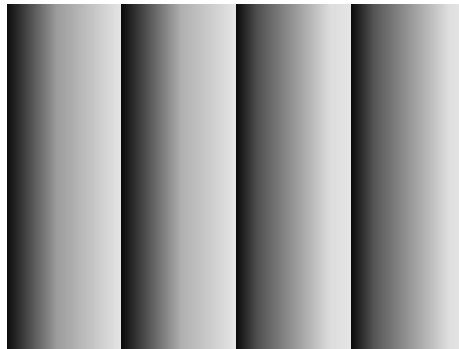
To execute the Display Test, select **4** from the DIAGNOSTIC TEST MENU, press **Enter** and follow the directions on the screen. The Display test contains seven subtests that test the display in various modes. Move the highlight bar to the subtest you want to execute and press **Enter**.

Subtest 01 VRAM Read/Write for VGA

This subtest writes constant data AAh and 55h and address data to video RAM 8MB. This data is then read from the video RAM and compared to the original data.

Subtest 02 Gradation for VGA

This subtest displays four colors: red, green, blue and white from left to right across the screen from black to maximum brightness. The display below appears on the screen when this subtest is executed.



To exit this subtest and return to the DISPLAY TEST menu, press **Enter**.

Subtest 03 Gradation for LCD

This subtest displays several horizontal bands of multiple color, followed by red, green and blue bars. Each bar displays black on the top and the brightest color at the bottom.

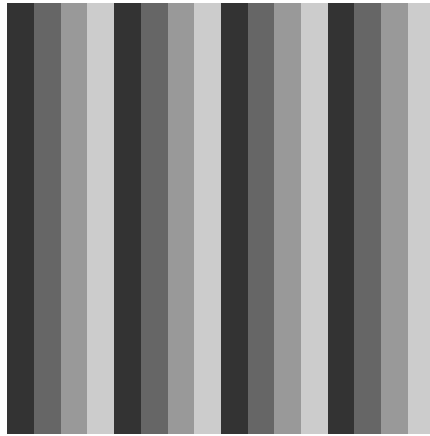
Next, this subtest displays full screen of eight colors: red, semi-red, green, semi-green, blue, semi-blue, white, and semi-white.

Each color displays for three seconds.

Subtest 04 Gradation & Mode test for VGA

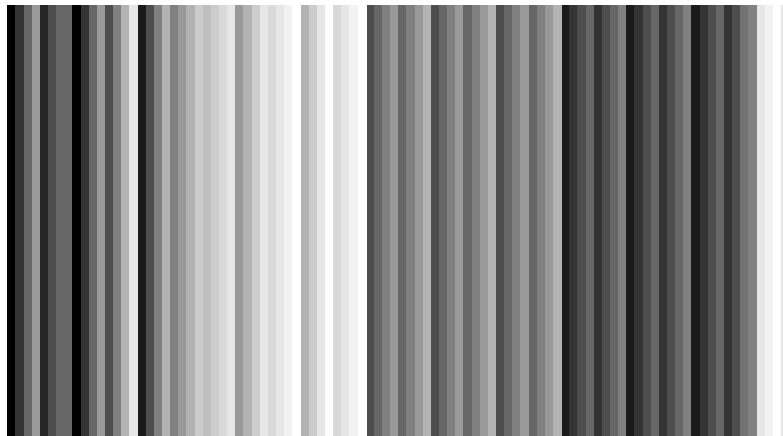
This subtest displays gradations for each mode. Execute the test, then press **Enter** to change the mode.

The display below appears on the screen when this subtest is executed. Pressing **Enter** changes the size of the displayed image.



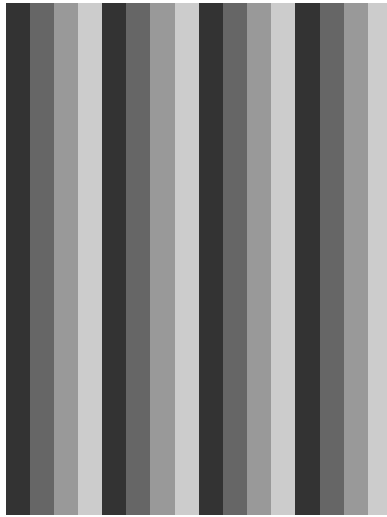
[Mode 12]

Pressing **Enter** changes the size of the displayed image.



[Mode 13]

Pressing **Enter** changes the size of the displayed image.



[Mode 3]

Pressing **Enter** changes the size of the displayed image in the following order:

Mode 111	640*480	64K
Mode 112	640*480	16M
Mode 114	800*600	64K
Mode 115	800*600	16M
Mode 117	1024*768	64K



[Mode 111 640*480 64K]

To exit this subtest and return to the DISPLAY TEST menu, press **Ctrl + Break**.

Subtest 05 All Dot On /Off for LCD

This subtest displays an all-white screen (all dots on) for three seconds then an all-black screen (all dots off) for three seconds.

To exit this subtest and return to the DISPLAY TEST menu, press **Ctrl + Break**.

3.8 Printer Test

To execute the Printer Test, select **6** from the DIAGNOSTIC TEST MENU, press **Enter** and follow the directions on the screen. The Printer Test contains three subtests that test the output of the printer connected to the computer. The following messages will appear after selecting the Printer Test from the DIAGNOSTIC TEST MENU. Answer each of the questions with an appropriate response to execute the test.

NOTE: A Port Replicator and an IBM compatible printer must be connected to the system to execute this test.

The following message will appear when the printer test is selected:

```
channel#1 = XXXXh
channel#2 = XXXXh
channel#3 = XXXXh
Select the channel number (1-3) ?
```

The printer I/O port address is specified by the XXXXh number. The computer supports three printer channels. Select the printer channel number, and press **Enter** to execute the selected subtest.

Subtest 01 Ripple Pattern

This subtest prints characters for codes 20h through 7Eh line-by-line while shifting one character to the left at the beginning of each new line.

```
:"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNopqrstuvwxyz[\]^_`abcdefghijklmnop
:"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNopqrstuvwxyz[\]^_`abcdefghijklmnop
:"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNopqrstuvwxyz[\]^_`abcdefghijklmnopq
#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNopqrstuvwxyz[\]^_`abcdefghijklmnopqr
$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNopqrstuvwxyz[\]^_`abcdefghijklmnopqrs
%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNopqrstuvwxyz[\]^_`abcdefghijklmnopqrst
&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNopqrstuvwxyz[\]^_`abcdefghijklmnoprstu
'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNopqrstuvwxyz[\]^_`abcdefghijklmnoprstuv
()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNopqrstuvwxyz[\]^_`abcdefghijklmnoprstuvw
*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNopqrstuvwxyz[\]^_`abcdefghijklmnoprstuvwxy
```

Subtest 02 Function

This subtest is for IBM compatible printers, and tests the following functions:

Normal print
Double-width print
Compressed print
Emphasized print
Double-strike print
All characters print

This subtest prints the various print types shown below:

```
PRINTER TEST
1. THIS LINE SHOWS NORMAL PRINT.
2. THIS LINE SHOWS DOUBLE-WIDTH PRINT.
3. THIS LINE SHOWS COMPRESSED PRINT.
4. THIS LINE SHOWS EMPHASIZED PRINT.
5. THIS LINE SHOWS DOUBLE-STRIKE PRINT.
6. ALL CHARACTERS PRINT
 !"#%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMN
OPQRSTUVWXYZ[\]^_`abcdefghijklmnop
qrstuvwxyz{|}~
```

Subtest 03 Wrap around

NOTE: To execute this subtest, a printer wraparound connector must be connected to the printer port in the Port Replicator. The printer wraparound connector (34M741986G01) wiring diagram is described in Appendix F.

This subtest checks the output and bi-directional modes of the data control and status lines through the parallel port wraparound connector.

3.9 Async Test

To execute the Async Test, select **7** from the DIAGNOSTIC TEST MENU, press **Enter** and follow the directions displayed on the screen. The Async test contains two subtests that test the asynchronous communication functions. Move the highlight bar to the subtest you want to execute and press **Enter**.

Subtests require the following data format:

Method: Asynchronous
Speed: 38400BPS (Subtests 06, 07)
Data: 8 bits and one parity bit (EVEN)
Data pattern: 20h to 7Eh

Subtest 01 Wraparound (board)

NOTE: To execute this subtest an RS-232C wraparound connector (34M741621G01) must be connected to the RS-232C port. The RS-232C wraparound connector wiring diagram is described in Appendix F.

This subtest checks the data send/receive function through the wraparound connector.

Subtest 02 Point to Point (send)

NOTE: To execute this subtest, two machines must be connected with an RS-232C direct cable. One machine should be set as “send” (subtest 02) and the other set as “receive” (subtest 03). The wiring diagram for the RS-232C direct cable is described in Appendix F.

This subtest sends 20h through 7Eh data to the receive side, then receives the sent data and compares it to the original data.

Subtest 03 Point to Point (receive)

This subtest is used with subtest 02 described above. This subtest receives the data from the send side, then sends the received data.

Subtest 04 Interrupt Test

This subtest checks the Interrupt Request Level of IRQ 4, 3 and 5 from the send side.

Subtest 06 FIR/SIR Point to Point (send)

NOTE: To execute subtests 06 and 07, each computer must have access to the other computer's infrared port.

This subtest sends 20h through 7Eh data to the receive side, then receives the sent data and compares it to the original data through the FIR/SIR port.

Subtest 07 FIR/SIR Point to Point (receive)

This subtest is used with subtest 06 described above. This subtest receives the data from the send side, then sends the received data through the FIR/SIR port.

3.10 Hard Disk Test

To execute the Hard Disk Test, select **8** from the DIAGNOSTIC TEST MENU, press **Enter**, and follow the directions on the screen. The hard disk test contains ten subtests that test the hard disk drive functions.

NOTE: *To execute the subtest 02,03,04,06,09 or 10, the system requires you to enter password.*

The contents of the hard disk will be erased when the subtest 02, 03, 04, 06,09, or 10 is executed. Before running the test, the customer should transfer the contents of the hard disk to floppy disk. If the customer has not or cannot perform the back-up, create back-up disks as described below.

Check to see if the Microsoft Create System Disks Tools (MSCSD.EXE) still exists in the System Tools Folder. (This tool can be used only once.) If it exists, use it to back up the pre-installed software, then use the Backup utility in the System Tools folder to back up the entire disk, including the user's files.

Refer to the operating system instructions.

After selecting the hard disk test from the DIAGNOSTIC TEST MENU, answer each of the questions with an appropriate response to execute the test.

1. Select the hard disk drive number to be tested.

Test drive number select (1:HDD#1, 2:HDD#2, 0:HDD1&2)

2. This message is used to select the error dump operation when a data compare error is detected. Select **yes** or **no**.

Data compare error dump (1:no, 2:yes) ?

This message is used to select whether or not the HDD status is displayed on the screen. The HDD status is described in section 3.19. Select **yes** or **no**.

Detail status display (1:no, 2:yes) ?

3. The Hard Disk Test message will appear after you respond to the Detail Status prompt. Select the number of the subtest you want to execute and press **Enter**. The following message will appear during each subtest.

```
HARD DISK TEST      XXXXXXXX

SUB-TEST   : XX
PASS COUNT : XXXXX   ERROR COUNT  : XXXXX
WRITE DATA : XX     READ DATA  : XX
ADDRESS    : XXXXXX  STATUS       : XXX
```

The first three digits of the ADDRESS indicate which cylinder is being tested, the fourth digit indicates the head and the last two digits indicate the sector.

The first digit of the STATUS number indicates the drive being tested and the last two digits indicate the error status code as explained in Table 3-4.

Subtest 01 Sequential Read

This subtest is a sequential reading of all the tracks on the HDD starting at track 0. When all the tracks on the HDD have been read, the test starts at the maximum track and reads the tracks on the HDD sequentially back to track 0.

Subtest 02 Address Uniqueness

This subtest writes unique address data to each sector of the HDD track-by-track. The data written to each sector is then read and compared with the original data. There are three ways the HDD can be read:

- Forward sequential
- Reverse sequential
- Random

Subtest 03 Random Address/Data

This subtest writes random data to random addresses on the HDD cylinder, head and sector. This data is then read and compared to the original data.

Subtest 04 Cross Talk & Peak Shift

This subtest writes eight types of worst pattern data (listed below) to a cylinder, then reads the data while moving from cylinder to cylinder.

Worst pattern data	Cylinder
'B5ADAD'	0 cylinder
'4A5252'	1 cylinder
'EB6DB6'	2 cylinder
'149249'	3 cylinder
'63B63B'	4 cylinder
'9C49C4'	5 cylinder
'2DB6DB'	6 cylinder
'D24924'	7 cylinder

Subtest 06 Write Specified Address

This subtest writes specified data to a specified cylinder and head on the HDD.

Subtest 07 Read Specified Address

This subtest reads data that has been written to a specified cylinder and head on the HDD.

Subtest 09 Sequential Write

This subtest writes specified 2-byte data to all of the cylinders on the HDD.

Subtest 10 W-R-C Specified Address

This subtest writes data to a specified cylinder and head on the HDD, then reads the data and compares it to the original data.

3.11 Real Timer Test

To execute the Real Timer Test, select **9** from the DIAGNOSTIC TEST MENU, press **Enter** and follow the directions on the screen. The real timer test contains three Subtests that test the computer's real timer functions. Move the highlight bar to the Subtest you want to execute and press **Enter**.

Subtest 01 Real Time

A new date and time can be input during this Subtest. To execute the real time subtest follow these steps:

1. Select the subtest 01 and the following message will appear:

```
Current date : XX-XX-XXXX  
Current time : XX:XX:XX
```

```
Enter new date:
```

```
PRESS [ENTER] KEY TO EXIT TEST
```

2. If the current date is not correct, input the correct date at the "Enter new date" prompt and press **Enter**. To enter ":", press **Shift + ;**. The date is updated and the following prompt will appear:

```
Enter new time :
```

3. If the current time is not correct, input the correct time in 24-hour format and press **Enter**. The time is updated.

Subtest 02 Backup Memory

This Subtest performs the following backup memory check:

```
Writes 1-bit of "on" data to address 01h through 80h  
Writes 1-bit of "off" data to address 0Eh through 80h  
Writes the data pattern AAh and 55h to the RTC 114-byte memory  
(address 0Eh to 7Fh)
```

The Subtest reads and compares this data with the original data.

To exit, press **Ctrl + Break**.

Subtest 03 Real Time Carry

CAUTION: *When you execute this Subtest, the current date and time are erased.*

This Subtest checks the real time clock increments, making sure the date and time are displayed in the following format:

```
Current date : 12-31-1999  
Current time : 23:59:58
```

```
PRESS [Enter] KEY TO EXIT TEST
```

Press **Enter** to exit.

3.12 NDP Test

To execute the NDP test, select **10** from the DIAGNOSTICS TEST MENU, press **Enter** and follow the directions on the screen. The NDP test contains one Subtest that tests the computer's NDP functions.

Subtest 01 NDP

This test checks the following functions of the coprocessor:

- Control word
- Status word
- Bus
- Addition
- Multiplication

Press **Ctrl + Break** to exit.

3.13 Expansion Test

To execute the expansion test, select **11** from the DIAGNOSTICS TEST MENU, press **Enter** and follow the directions on the screen. The expansion test contains two subtests.

NOTE: To execute this subtest, the PC card wraparound connector is required.

Subtest 01 PCMCIA Wraparound

This test checks the following signal line of the PC card slot:

- Address line
- REG#, CE#1, CE#2 line
- Data line
- Speaker line
- Wait line
- BSY#, BVD1 line

This subtest is executed in the following order:

Sub#	Address	Good	Bad	Contents
01	00001 00001	nn nn	xx xx	Address line REG#, CE#1, CE#2 nn=A0, 90, 80, 00
02	00002	ww	rr	Data line ww=write data, rr=read data
03	00003	—	—	Speaker line
04	00004	40,80	xx	Wait line (40<xx<80)
05	00005	nn	xx	Other lines (BSY#, BVD1) NN=21, 00

NOTE: When the subtest 01 is executed, the following message will appear: Test slot number select (1:slot, 2:slot, 0:slot0&1)?

Select the slot to test.

Subtest 03 RGB monitor ID

For this test, the computer must be in CRT mode. Connect the CRT (an RGB monitor) with the external monitor port.

3.14 CD-ROM/DVD-ROM Test

To execute the CD-ROM/DVD-ROM test, select **13** from the DIAGNOSTICS TEST MENU, press **Enter** and follow the directions on the screen. The CD-ROM/DVD-ROM test contains six Subtests that test the computer's CD-ROM/DVD-ROM functions.

Subtest 01 Sequential Read

This Subtest is a sequential reading of one-block units (2K bytes) of all the logical addresses.

Subtest 02 Read Specified Address

This Subtest reads one-block data from a specified address.

Subtest 03 Random Address/Data

This Subtest reads one-block data and multi-block data from random addresses 200 times.

Subtest 04 Playback Music (CD only)

NOTE: You cannot use the Toshiba-EMI DVD-ROM TEST DISK TSD-1 for Subtest 04. For this test, use an ordinary music CD.

This Subtest reads track data from a specified track and plays the sound.

Subtest 05 RW 1 point W/R/C

This subtest performs the CD-RW drive test.

NOTE: For the CD-RW drive test, use CD-RW media that supports four-speed writing (media manufactured by RICOH or Mitsubishi Chemical are recommended.)

3.15 LAN Test

To execute the LAN test, select **14** from the DIAGNOSTICS TEST MENU, press **Enter** and follow the directions on the screen. The LAN test contains one Subtest that tests the computer's LAN function.

Subtest 01 MAC Display

This Subtest displays the MAC address of the computer's LAN function.

Source Address = xxxxxxxxxxxx

3.16 Wireless LAN Test (Agere)

This section describes how to perform the wireless LAN transmitting-receiving test with the test program.

Note: Use another computer (with Agere wireless LAN card) that can communicate by the wireless LAN as a reference machine to perform this test.

To start the Wireless LAN test program, follow the steps below:

Note: Before starting the wireless LAN test, make sure the Wireless Communication Switch on the left side of the computer is turned on. (The Wireless Communication LED lights orange.)

Release the write-protection of the floppy disk for the test.

Insert a floppy disk containing the test program into the target machine and turn on the target machine. The Wireless LAN test menu will appear.

```
#####
#### Wireless LAN sub system repair test VX.XX ####
#####
*
*      1 Transmit & Receive test [Responder]      *
*      2 MAC Address test [Mini-PCI Wireless LAN] *
*      3 Wireless LAN (WEP64/128) test            *
*
*      0 Transmit & Receive test [Initiator]      *
*
*****
*
....Press test number [1-3,0] ?
```

Press 1, 2 or 3, and the **Enter** to perform the corresponding sub test. To quit the Wireless LAN test program, eject the floppy disk and turn the computer off while the menu above is displayed.

Subtest 01 Transmit & Receive test

This sub test checks transmit and receive functions.

Transmit test

Press **1** to select the test and press **Enter** in the target machine as a responder. The following message will appear:

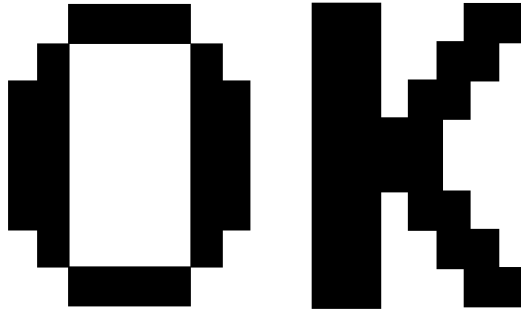
```
#####
### Wireless LAN sub system repair test VX.XX ###
#####
*
*      1 Transmit & Receive test [Responder]      *
*      2 MAC Address test [Mini-PCI Wireless LAN] *
*      3 Wireless LAN (WEP64/128) test            *
*
*      0 Transmit & Receive test [Initiator]      *
*
*****
*
...Press test number [1-2,0] ?1
===== RESPONDER SET =====
ORiWL.EXE Rev.03 Copyright (c) Toshiba Corporation,2000, 2001
Initializing...
[[[ Responder Mode ]]]
MAC address : XXXXXXXXXXXX
Ad-hoc mode
  SS ID : PHN Test
  Channel : 10
  Tx ratio : 2 Mbps
```

To prepare the tester machine for the Wireless LAN test program, insert a floppy disk containing the test program into the tester machine and turn on the tester machine. The Wireless LAN test menu will appear.

Press **0** to select the test and press **Enter** in the initiator machine. The following message will appear:

```
#####
### Wireless LAN sub system repair test VX.XX ###
#####
*
*      1 Transmit & Receive test [Responder]      *
*      2 MAC Address test [Mini-PCI Wireless LAN] *
*
*      0 Transmit & Receive test [Initiator]      *
*
*****
*
...Press test number [1-2,0] ?1
===== RESPONDER SET =====
ORiWL.EXE Rev.03 Copyright (c) Toshiba Corporation,2000, 2001
Initializing...
[[[ Responder Mode ]]]
MAC address : XXXXXXXXXXXX
Ad-hoc mode
  SS ID : PHN Test
  Channel : 10
  Tx ratio : 2 Mbp
  PASS : 134 ERROR : 0
```


When the machine has passed the test, “OK” message will appear in the test machine.



Then press **Enter** in the target machine; the “OK” message will appear also in the target machine.

Press **Enter** to return to the main menu.

Receive test

In receive test reverse the procedures of the transmit test. To prepare the tester machine for the Wireless LAN test program, insert a floppy disk containing the test program into the tester machine and turn on the tester machine. The Wireless LAN test menu will appear.

Press **1** to select the test and press **Enter**. The following message will appear:

```
#####
###      Wireless LAN sub system repair test  VX.XX      ###
#####
*
*      1  Transmit & Receive test [Responder]           *
*      2  MAC Address test [Mini-PCI Wireless LAN]      *
*      3  Wireless LAN (WEP64/128) test                 *
*
*      0  Transmit & Receive test [Initiator]           *
*
*****
*
...Press test number [1-2,0] ?1
===== RESPONDER SET =====
ORiWL.EXE Rev.03 Copyright (c) Toshiba Corporation,2000, 2001
Initializing...
[[[ Responder Mode ]]]
MAC address : XXXXXXXXXXXXX
Ad-hoc mode
  SS ID : PHN Test
  Channel : 10
  Tx ratio : 2 Mbps
  PASS : 134 ERROR : 0
```

Press **0** to select the test and press **Enter** in the target machine. The following message will appear:

```
#####
###      Wireless LAN sub system repair test  VX.XX      ###
#####
*
*      1  Transmit & Receive test [Responder]             *
*      2  MAC Address test [Mini-PCI Wireless LAN]        *
*      3  Wireless LAN (WEP64/128) test                   *
*
*      0  Transmit & Receive test [Initiator]            *
*
*****
*
...Press test number [1-2,0] ?1
===== RESPONDER SET =====
ORiWL.EXE Rev.03 Copyright (c) Toshiba Corporation,2000, 2001
Initializing...
[[[ Responder Mode ]]]
MAC address : XXXXXXXXXXXX
Ad-hoc mode
  SS ID : PHN Test
  Channel : 10
  Tx ratio : 2 Mbps
```

When the machine has passed the test, “OK” message will appear in the target machine.



Then press **Enter** in the test machine; the “OK” message will appear also in the test machine.

Press **Enter** to return to the main menu.

Subtest 02 Mac Address test

This subtest reads MAC Address. If there is no problem, the “OK” message will appear.

Subtest 03 Wireless LAN (WEP64/128) test

This subtest reads the WEP of the wireless LAN card installed in the target machine. A message similar to the following will appear:

```
***** This CARD is WEP *****  
Press any key to continue
```

3.17 Wireless LAN Test (Atheros)

This section describes how to perform the wireless LAN transmitting-receiving test with the test program.

Note: Use another computer (with Atheros wireless LAN card) that can communicate by the wireless LAN as a responder machine to perform this test.

In this test, the following items are tested:

- * Test PC [Initiator] side
 - (1) SKU (destination code) check
 - (2) Mac Address check
 - (3) Communication test (802.11a Main antenna)
 - (4) Communication test (802.11a Sub antenna)
 - (5) Communication test (802.11b)

- * [Responder] side
 - (1) Communication test (802.11b)

This program conducts the above test items continuously and displays results for each item during the test. However, only the last result for the whole test shall be checked. (The message "OK" or "NG" is displayed.)

When an "NG" item is detected during the test, the message "NG" is displayed on the screen and the test stops.

Note: This program takes a long time until the test ends.

To start the Wireless LAN test program, follow the steps below:

Note: Before starting the wireless LAN test, make sure the Wireless Communication Switch on the left side of the computer is turned on. (The Wireless Communication LED lights orange.)

When the tester machine has passed the test, "OK" message will appear in the tester machine.



Press **Enter** to return to the main menu.

When the tester machine has not passed the test, "NG" message will appear in the tester machine. Pressing **Enter** on the screen shows the following message.

```
*****  
*                                     *  
*      8.02 11a Tx Test AUX Antenna NG      *  
*                                     *  
*****
```

Then the test returns to the main menu automatically.

3.18 Sound/LAN/Modem Test

This section describes how to perform the Sound/LAN/Modem test with the test program.

CAUTION: *The system is capable of producing high volume sound. When you use a headphone, be careful to set the volume low and adjust it as necessary. Using a headphone at full volume might damage your ears.*

Toshiba MS-DOS is required to run the DIAGNOSTICS TEST PROGRAM. To start the DIAGNOSTIC TEST PROGRAM, follow these steps:

- (a) Insert the test program disk in the floppy disk drive and turn on the computer.
(The Diagnostics Disk contains the MS-DOS boot files.)

The following menu will appear:

```
#####
###      Satellite xxxx DIAGNOSTICS PROGRAM (SOUND/LAN/MODEM TEST)  ###
#####
*
*          1          ( Microphoned Recording & play )          *
*          2          ( Sin wave )                               *
*          3          ( LAN )                                    *
*          4          ( MODEM )                                 *
*
*****
...Press test number [1-4] ? _
```

- (b) To execute the TEST, select the option number you want to execute and press **Enter**.

Subtest 01 Microphoned recording & play

This subtest checks the function of the CODEC A/D D/A converter. Both the microphone and headphone terminal can be checked at the same time.

Before executing this subtest, connect an external microphone to the computer. IF necessary, connect a headphone to the computer to check whether the headphone jack of the computer is working properly.

When the subtest is selected, the following message appears.

```
....Press test number[1-4] ? pause
```

Press any key, and the following two messages appear.

```
Press any key to continue...
....Press test number[1-4] ? call micrec
```

The sound is recorded for five seconds automatically from the microphone. After the recording is completed, the computer immediately plays back the sound recorded. When the playing is finished, a message similar to the one below appears.

```
Completing      SoundMAX/ICH microphone capture test
End time       XXX XXX XX XX*XX:XX XXXX
System Status 0x0
```

```
Performing SoundMAX/ICH play buffer to line out
Start Time:    XXX XXX XX XX:XX:XX XXXX
```

```
Play to destination is LINEOUT
Volume requested is X.XXX dB
Play from buffer name is BUFFER0
Requested play time is 5.000 seconds.
Actual play time will be 5.000 seconds.
```

```
Completing SoundMAX/ICH play buffer to line out
End Time XXX XXX XX :XX:XX XXXX
System Status 0x0
```

```
Test completed at XXX XXX XX :XX:XX XXXX
System completion code was 0x0
```

```
....Press test number[1-4] ?
```


To execute a subtest continuously, select the test number and press **Enter**. To exit the Sound/LAN/Modem test, remove the test program disk from the USB FDD and turn the computer off.

Subtest 02 Sin Wave

This subtest is executed by the load format of COM file (ADSIN.COM). The program expands sin wave data table to data in 16-64KB, and creates play data (It sounds like continuous beep). By using wave measuring devices such as an oscilloscope, this program can read sine wave without expanding.

The subtest is executed, the following message appears.

```
....Press test number[1-4] ? pause  
Press any key to continue...
```

Press any key, and the following message appears. Then sin wave is expanded to 16-64KB data and is played.

```
....Press test number[1-4] ? call sin
```

When the beep sound finished, the following message appears.

```
Press any key to continue...
```

To execute a subtest continuously, select the test number and press **Enter**. To exit the Sound/LAN/Modem test, remove the test program disk from the USB FDD and turn the computer off.

Subtest 03 LAN Test

- (a) Select **3** to execute and press **Enter**. The following message will appear:

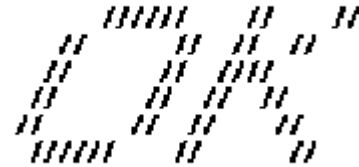
```

                                     COMPLETED          Repeat count = 00000
                                                         Error count = 00000

XXXX (XXXXX) LAN TEST Vol.X.XX

100Mbps Auto-negotiation TxRx Test
Destination Address      = xxxxxxxxxxxxxx
Source Address           = xxxxxxxxxxxxxx

** 100Base-TX Full-Duplex **
< TRANSMIT >
< RECEIVE >
```



NOTE: The menu displayed by your computer may be slightly different from the one shown above.

- (b) Check that the message “OK” appears.
- (c) Press **Enter** to return to Main Menu.

Subtest 04 Modem Test

- (a) Select **4** to execute and press **Enter**. The following message will appear:

```
ICH MDC Test Program with Modem Sound ( PCB Interface )
Version X.X

* Scorpio Modem Initialize           :OK
* Digital Loopback Test             :OK
* Modem Sound Test                   :( Operator's Check!! )
```

- (b) After a few seconds, the following message will appear:

```
...Press Key ( Y = OK , N =NG )
```

If you hear the modem sound from the speakers, press **Y**. Otherwise, press **N**.

NOTE: *The menu displayed by your computer may be slightly different from the one shown above.*

- (c) After you press Y or N, the RJ11 Connection Check (LED) ((Operator's Check LED)) test will execute, and the following message will appear:

```
...Press Key ( Y = OK , N =NG )
```

If the color in the LED of the connection checker is orange, press **Y**. Otherwise, press **N**.

Press **Enter** to return to Main Menu.

3.19 IEEE1394 Test Program

This section describes how to perform the IEEE1394 test with the test program.

Toshiba MS-DOS is required to run the DIAGNOSTICS TEST PROGRAM. To start the DIAGNOSTIC TEST PROGRAM, follow these steps:

- (a) Insert the Diagnostics disk in the floppy disk drive and turn on the computer.
(The Diagnostics Disk contains the MS-DOS boot files.)

The following menu will appear:

```

*****
*          -----
*          IEEE1394 [TSB!"LV28] test menu ( For Repair ) VX.XX
*          -----
*
*          =====          Select test No. and [Enter]          =====
*
*          1 : ... Ieee1384 test
*          2 : ... Responder tool
*          3 : ... ID Check
*
*****
Select [1-3]?

```

- (b) To execute the TEST, select the test number you want to execute and press **Enter**.

Subtest 01 IEEE1394 test

This program checks the data transporting between responder machine and target machine.

<p>NOTE: Use another computer that can communicate by IEEE1394 (i. Link) cable as a reference machine to perform this test.</p>
--

Subtest 02 Responder tool

This program initializes the machine responder.

Subtest 03 ID Check

This program checks the GUID.

3.20 Bluetooth Test

This section describes how to perform the Bluetooth test program to check if the Bluetooth functions of computer are working properly. To start the Bluetooth test program, follow the steps below:

NOTE: Use another computer that can communicate by the Bluetooth as a reference machine to perform this test.

Insert a floppy disk containing the test program into the target machine and turn on the target machine. The following Bluetooth test menu will appear:

```
#####
### Bluetooth sub system test program VX.XX ###
#####
*
*      1..... BD_ADDR check
*
*      3..... communication test (DUT mode)
*
*      T..... communication test (TEST mode)
*
*****
....Press test number [1, 3, T] ? _
```

Press 1 or 3 key to perform the corresponding subtest. To quit the Bluetooth test program, eject the floppy disk and turn the computer off while the menu above is displayed.

Subtest 01 BD_ADDR check

This subtest checks the BD_ADDR functions. When the Bluetooth test menu is displayed, press **1** to select the test and press **Enter**. The following message will appear:

```

-----
Bluetooth Subsystem T&D for PCSE(BD_ADDR) VerX.XX Copyright (C) by TOSHIBA Co.
-----

Initializing ...

```

When the machine has passed the test, it displays **BD_ADDR**. If **BD_ADDR** has no problem, the following message is displayed.

```

-----
Bluetooth Subsystem T&D for PCSE(BD_ADDR) VerX.XX Copyright (C) by TOSHIBA Co.
-----

My BD_ADDR = XXXXXXXXXXXX [h]

PPPPPP  A    SSSSS  SSSSS
P    P  A A  S    S S    S
P    P  A  A  S      S
PPPPPP  A    A  SSSSS  SSSSS
P      AAAAAA  S      S
P      A    A S    S S    S
P      A    A  SSSSS  SSSSS

```

If the target machine has any problem, it displays **Error CODE**. The following message is displayed.

```
-----  
Bluetooth Subsystem T&D for PCSE(BD_ADDR) VerX.XX Copyright (C) by TOSHIBA Co.  
-----
```

```
My BD_ADDR = XXXXXXXXXXXX [h]
```

```
FFFFFF      A      III  L  
F           A A      I  L  
F           A  A      I  L  
FFFFFF A       A      I  L  
F          AAAAAA     I  L  
F           A  A      I  L  
F           A  A      III LLLLLL
```


If the machine detects a malfunction, it indicates the error code as shown below.

The error code begins with the least significant digit.

Error code

Table 3-2 Error code for Bluetooth test (BD_ADDR) (1/2)

Error code	Meaning
0x01	Unknown HCI Command.
0x02	No Connection.
0x03	Hardware Failure.
0x04	Page Timeout.
0x05	Authentication Failure.
0x06	Key Missing.
0x07	Memory Full.
0x08	Connection Timeout.
0x09	Max Number Of Connections.
0x0a	Max Number Of SCO Connections To A Device.
0x0b	ACL Connection already exists.
0x0c	Command Disallowed.
0x0d	Host Rejected due to limited resources.
0x0e	Host Rejected due to security reasons.
0x0f	Host Rejected due to remote device is only a personal device.
0x10	Host Timeout.
0x11	Unsupported Feature or Parameter Value.
0x12	Invalid HCI Command Parameters.
0x13	Other End Terminated Connection: Used Ended Connection.
0x14	Other End Terminated Connection:Low Resources.
0x15	Other End Terminated Connection: About to Power Off.
0x16	Connection Terminated by Local Host.
0x17	Repeated Attempts.
0x18	Paring Not Allowed.
0x19	Unknown LMP PDU.
0x1a	Unsupported Remote Feature.
0x1b	SCO Offset Rejected.
0x1c	SCO Interval Rejected.
0x1d	SCO Air Mode Rejected.
0x1e	Invalid LMP Parameters.
0x1f	Unspecified Error.

** See the Specification of the Bluetooth System for details.

When the Bluetooth test menu is displayed, press **T** to select the test and press **Enter** in the test machine. The following message will appear:

```

-----
Bluetooth Subsystem T&D for PCSE (CS-Air) VerX.XX Copyright (C) by TOSHIBA Co.
-----
+-----+
|           |
|   Tester   |
|           |
+-----+

[ESC]:Finish Tester  [SPACE]:Start
Is DUT ready?

```

Then press **Space** to start the Bluetooth communication test.

When the machine has passed the test, it displays **BD_ADDR of the DUT**. If the connection with the tester is completed, the progress bar stops. The following message is shown.

```

-----
Bluetooth Subsystem T&D for PCSE (CS-Air) VerX.XX Copyright (C) by TOSHIBA Co.
-----
+-----+
|           | BD_ADDR of the DUT = XXXXXXXXXXXXX [h]
+-----+

  CCCC   OOO   M   M PPPPPP L   EEEEEE TTTTTTT EEEEEEE DDDDD
C   C O   O MM   MM P   P L   E       T   E       D   D
C     O   O M M M M P   P L   E       T   E       D   D
C     O   O M M M PPPPPP L   EEEEEE T   EEEEEEE D   D
C     O   O M   M P   L   E       T   E       D   D
C   C O   O M   M P   L   E       T   E       D   D
  CCCC   OOO   M   M P   LLLLLL EEEEEE T   EEEEEEE DDDDD

Testing is finished

A>_

```

If the target machine has any problem, the following message “INCOMPLETE” is displayed with the **Error CODE**.

```

-----
Bluetooth Subsystem T&D for PCSE (CS-Air) VerX.XX Copyright (C) by TOSHIBA Co.
-----

+-----+
|          DUT          |   BD_ADDR of the DUT = XXXXXXXXXXXXX [h]
+-----+

III N    N  CCCC   OOO  M    M P P P P P L      EEEEE TTTTTT EEEEE
I  NN   N C    C O  O MM  MM P    P L      E        T    E
I  N N   N C      O    O M M M M P    P L      E        T    E
I  N N   N C      O    O M  M M P P P P P L      EEEEE T    EEEEE
I  N    N N C      O    O M    M P    L      E        T    E
I  N    NN C    C O  O M    M P    L      E        T    E
III N    N  CCCC   OOO  M    M P          LLLLLL EEEEE T    EEEEE

                                Testing is finished

_Press any key to continue. . .
    
```

If the machine detects a malfunction, it indicates the error code as shown below.

The error code begins with the least significant digit.

Error code

Table 3-3 Error code for Bluetooth test (BD_ADDR of the DUT) (1/2)

Error code	Meaning
0x01	Unknown HCI Command.
0x02	No Connection.
0x03	Hardware Failure.
0x04	Page Timeout.
0x05	Authentication Failure.
0x06	Key Missing.
0x07	Memory Full.
0x08	Connection Timeout.
0x09	Max Number Of Connections.
0x0a	Max Number Of SCO Connections To A Device.
0x0b	ACL Connection already exists.
0x0c	Command Disallowed.
0x0d	Host Rejected due to limited resources.
0x0e	Host Rejected due to security reasons.
0x0f	Host Rejected due to remote device is only a personal device.
0x10	Host Timeout.
0x11	Unsupported Feature or Parameter Value.
0x12	Invalid HCI Command Parameters.
0x13	Other End Terminated Connection: User Ended Connection.
0x14	Other End Terminated Connection: Low Resources.
0x15	Other End Terminated Connection: About to Power Off.
0x16	Connection Terminated by Local Host.
0x17	Repeated Attempts.
0x18	Paring Not Allowed.
0x19	Unknown LMP PDU.
0x1a	Unsupported Remote Feature.
0x1b	SCO Offset Rejected.
0x1c	SCO Interval Rejected.
0x1d	SCO Air Mode Rejected.
0x1e	Invalid LMP Parameters.
0x1f	Unspecified Error.

** See the Specification of the Bluetooth System for details.

Table 3-3 Error code for Bluetooth test (BD_ADDR of the DUT) (2/2)

Error code	Meaning
0x20	Unsupported LMP Parameter Value.
0x21	Role Change Not Allowed.
0x22	LMP Response Timeout.
0x23	LMP Error Transaction Collision.
0x24	LMP PDU Not Allowed.
0x25	Not Exist
0x26	Not Exist
0x27	Not Exist
0x28	Not Exist
0x29	Not Exist
0x2a	Not Exist
0x2b	Not Exist
0x2c	Not Exist
0x2d	Not Exist
0x2e	Not Exist
0x2f	Not Exist

** See the Specification of the Bluetooth System in detail.

3.21 Error Code and Error Status Names

Table 3-4 lists the error codes and error status names for the Diagnostic Test.

Table 3-4 Error codes and error status names (1/3)

Device name	Error code	Error status name
(Common)	FF	Data Compare Error
System	01 03 04 05 06 07 08 09 10	ROM Checksum Error Serial ID Write Error Not supported PS-System Sending Error For AC-Adopter Sending Error For 1st Battery Sending Error For 2nd Battery Thormistor error (1) Thormistor error (2) Thormistor error (3)
Memory	01 02 0D	RAM Parity Error Protected Mode Not Changed Cache Memory Error
USB	EE FE FD F0 F1 F2 F3 F4 F5 F6 F7 F8 F9 FA EF ED	USB-NO DESCR. ERROR USB-GET DESCR. ERROR (FIRST) USB-SET ADDRESS ERROR HUB-GET DESCR. ERROR (Top 8B) HUB-GET DESCR. ERROR (Whole) HUB-SET CONFIGURATION ERROR HUB-GET DESCR. ERROR (DESCR.) HUB-SET FEATURE ERROR (P ON) HUB-GET STATUS ERROR HUB-SET FEATURE ERROR (RESET) HUB-CLEAR FEATURE ERROR HUB-CLEAR FEATURE1 ERROR HUB-SET FEATURE ERROR (Eanab.) HUB-CLEAR FEATURE2 ERROR USB-OVER COUNT ERROR USB-GET DESCR. ERROR (SECOND)

Table 3-4 Error codes and error status names (2/3)

Device name	Error code	Error status name
FDD	01 02 03 04 06 08 09 10 20 40 60 80 EE	Bad Command Error Address Mark Not Found Write Protected Record Not Found Media Removed DMA Overrun Error DMA Boundary Error CRC Error FDC Error Seek Error Not Drive Error Time Out Error Write Buffer Error
Printer	01 08 10 20 40 80	Time Out Fault Select Line Out Of Paper Power Off Busy Line
ASYNC	01 02 04 08 10 20 40 80 88	DSR Off Time Out CTS Off Time Out RX-Empty Time Out TX-BUFFER Full Time Out Parity Error Framing Error Overrun Error Line Status Error Modem Status Error
HDD	01 02 04 05 07 08 09 0A 0B 10 11 20 40 80 AA BB CC E0 EE DA	Bad Command Error Address Mark Not Found Record Not Found HDC Not Reset Error Drive Not Initialized HDC Overrun (DRQ) DMA Boundary Error Bad Sector Bad Track Error ECC Error ECC Recover Enable HDC Error Seek Error Time Out Error Drive Not Ready Undefined Error Write Fault Status Error Access Time Out Error No HDD

Table 3-4 Error codes and error status names (3/3)

Device name	Error code	Error status name
NDP	01 02 03 04 05 06	No Co-Processor Control Word Error Status Word Error Bus Error Addition Error Multiply Error
Expansion	C1 C4 C5 C6 C7 C8 CB CD CE	Address Line Error CE#2 Line Error DATA Line Error WAIT Line Error BSY# Line Error BVD1 Line Error ZV Port Error No PCMCIA Card Type Error ZV_CONT Error
CD/DVD-ROM	01 02 03 04 05 06 09 11 20 40 80 90 BO	Bad Command Illegal Length Unit Attention Media Change Request Media Detected Additional Sense Boundary Error Corrected Data Error Drive Not Ready Seek Error Time Out Reset Error Address Error
Keyboard	01 02 03 04 05 06	Mouse Interface Error IPS Interface Error Interface Error Retransmit Error Mouse Handler Not Support PS/2 Mouse & IPS Not Support

3.22 Hard Disk Test Detail Status

When an error occurs in the hard disk test, the following message is displayed:

```
HDC status = XXXXXXXX
```

Detailed information about the hard disk test error is displayed on the screen by an eight-digit number. The first four digits represent the hard disk controller (HDC) error status number and the last four digits are not used.

The hard disk controller error status is composed of two bytes; the first byte displays the contents of the HDC status register in hexadecimal form and the second byte displays the HDC error register.

The contents of the HDC status register and error register are listed in Tables 3-5 and 3-6.

Table 3-5 Hard disk controller status register contents

Bit	Name	Description
7	BSY (Busy)	"0" ... HDC is ready. "1" ... HDC is busy.
6	DRDY (Drive ready)	"0" ... Hard disk drive is not ready to accept any command. "1" ... Hard disk drive is ready.
5	DWF (Drive write fault)	"0" ... DWF error is not detected. "1" ... Write fault condition occurred.
4	DSC (Drive seek complete)	"0" ... The hard disk drive heads are not settled over a track. "1" ... The hard disk drive heads are settled over a track.
3	DRQ (Data request)	"0" ... Drive is not ready for data transfer. "1" ... Drive is ready for data transfer.
2	CORR (Corrected data)	"0" ... Not used "1" ... Correctable data error is corrected.
1	IDX (Index)	"0" ... Not used "1" ... Index is sensed.
0	ERR (Error)	"0" ... Normal "1" ... The previous command was terminated with an error.

Table 3-6 Error register contents

Bit	Name	Description
7	BBK1 (Bad block mark)	“0” ... Not used “1” ... A bad block mark is detected.
6	UNC (Uncorrectable)	“0” ... There is no uncorrectable data error. “1” ... Uncorrectable data error has been detected.
5	—	Not used
4	IDNF (Identification)	“0” ... Not used “1” ... There was no ID field in the requested sector.
3	—	Not used
2	ABRT (Abort)	“0” ... Not used “1” ... Illegal command error or a drive status error occurred.
1	TK00 (Track 0)	“0” ... The hard disk found track 0 during a recalibrate command. “1” ... The hard disk could not find track 0 during a recalibrate command.
0	—	Not used.

3.23 Head Cleaning

3.23.1 Function Description

This function cleans the heads in the FDD by executing a series of head load/seek and read operations. A cleaning kit is necessary to perform this program.

3.23.2 Operations

1. Selecting test **4** from the DIAGNOSTIC MENU and pressing **Enter** displays the following messages:

```
DIAGNOSTICS - FLOPPY DISK HEAD CLEANING : VX.XX
```

```
Mount cleaning disk(s) on drive(s).
```

```
Press any key when ready.
```

2. Remove the Diagnostics Disk from the FDD, then insert the cleaning disk and press **Enter**.
3. When the following message appears, the FDD head cleaning has begun.

```
cleaning start
```

4. The display automatically returns to the DIAGNOSTIC MENU when the program is completed.

2. The error information displayed on the screen can be manipulated by the following number keys:
 - 1 scrolls the display to the next page.
 - 2 scrolls the display to the previous page.
 - 3 returns to the Diagnostic Menu.
 - 4 erases all error log information in RAM.
 - 5 outputs the error log information to a printer.
 - 6 reads the log information from a floppy disk.
 - 7 writes the log information to a floppy disk.

3. In the case of “error retry OK”, a capital “R” will be placed at the beginning of the error status. However, it is not added to the error count.

3.25 Running Test

3.25.1 Function Description

This function automatically executes the following tests in sequence:

1. System test (subtest 01)
2. Memory test (subtests 01, 02, 04, and 06)
3. Real timer test (subtest 02)
4. Display test (subtest 01)
5. FDD test (subtest 02)
6. HDD test (subtests 01 and 05)
7. Printer test (subtest 03) if selected
8. Async test (subtest 01) (not supported in this model)

3.25.2 Operations

NOTE: Do not forget to load a work disk in the FDD. If a work disk is not loaded, an error will be generated during the FDD testing.

1. Remove the diagnostics disk from the floppy disk drive and insert the work disk.
2. Select **6** from the Diagnostic Menu and press **Enter**, the following message displays:

```
Printer wrap around test (Y/N) ?
```

Selecting **Y (yes)** executes the printer wraparound test. A printer wraparound connector must be connected to the parallel port of the computer to properly execute this test.

3. Select **Y** or **N** and press **Enter**. The following message will appear:

```
Serial#A wrap around test (Y/N) ?
```

Selecting **Y (yes)** executes the ASYNC wraparound test. An RS-232-C wraparound connector must be connected to the serial port of the computer to properly execute this test.

4. Select **No** and press **Enter**. The following message will appear:

```
Mount the work disk(s) on the drive(s),  
then press [Enter] key.  
[Warning : The contents of the disk(s),  
will be destroyed.]
```

5. This program is executed continuously. To terminate the program, press **Ctrl +Break**.

3.26 Floppy Disk Drive Utilities

3.26.1 Function Description

This function formats the FDD, copies the floppy disk and displays the dump list for both the FDD and HDD.

1. FORMAT

NOTE: This program is only for testing a floppy disk drive. The option is different from the Toshiba MS-DOS *FORMAT* command.

This program can format a 5.25-inch or 3.5-inch floppy disk in the following formats:

- (a) 2DD: Double-sided, double-density, double-track, 96/135 TPI, MFM mode, 512 bytes, 9 sectors/track.
- (b) 2HD: Double-sided, high-density, double-track, 96/135 TPI, MFM mode, 512 bytes, 18 sectors/track.

2. COPY

This program copies data from a source floppy disk to a target floppy disk.

3. DUMP

This program displays the contents of the floppy disk and the designated sectors of the hard disk on the display.

4. HDD ID

This program reads the hard disk ID and displays the hard disk ID, serial number and other hard disk information.

3.26.2 Operations

1. Selecting **7** from the DIAGNOSTIC MENU and pressing **Enter** displays the following message:

```
[ FDD UTILITIES ]

1 - FORMAT
2 - COPY
3 - DUMP
4 - HDD ID READ
9 - EXIT TO DIAGNOSTICS MENU
```

2. FORMAT program

- (a) Selecting FORMAT displays the following message:

```
DIAGNOSTICS - FLOPPY DISK FORMAT : VX.XX
Drive number select (1:A, 2:B) ?
```

- (b) Select a drive number to display the following message:

```
Type select (0:2DD, 3:2HD) ?
```

- (c) Select a media/drive type number and press **Enter**. A message similar to the one below will be displayed:

```
Warning : Disk data will be destroyed.
Insert work disk into drive A:
Press any key when ready.
```

- (d) Remove the Diagnostics Disk from the FDD, insert the work disk and press any key.

The following message will be displayed when the FDD format is executed:

```
[ FDD TYPE ] : TRACK  = XXX
[ FDD TYPE ] : HEAD   = X
[ FDD TYPE ] : SECTOR = XX

Format start

[[track, head = XXX X]]
```

After the floppy disk is formatted, the following message will appear:

```
Format complete
Another format (1:Yes/2:No) ?
```

- (e) Typing **1** displays the message from step (c) above. Typing **2** returns the test to the DIAGNOSTIC MENU.

3. COPY program

- (a) When COPY is selected, the following message appears:

```
FLOPPY DISK FORMAT & COPY : VX.XX
Type select (0:2DD,3:2HD) ?
```

- (b) Selecting a media/drive type number will display a message similar to the one below:

```
Insert source disk into drive A:
Press any key when ready.
```

- (c) Remove the Diagnostics Disk from the FDD, insert the source disk and press any key. The following message will appear, indicating the program has started.

```
[ FD TYPE ] : TRACK   = XXX
[ FD TYPE ] : HEAD    = X
[ FD TYPE ] : SECTOR  = XX

Copy start

[[ track,head = XXX X ]]
```

- (d) Remove the source disk from the FDD, insert a formatted work disk and press any key. The [[track, head = XXX X]] message will appear and start copying to the target disk. When the amount of data is too large to be copied in one operation, the message from step (b) displays again. After the floppy disk has been copied, the following message will appear:

```
Copy complete
Another copy (1:Yes/2:No) ?
```

- (e) To copy another disk, type **1** and the message from step (a) displays again. Entering **2** returns the test program to the DIAGNOSTIC MENU.

4. DUMP program

- (a) When DUMP is selected, the following message appears:

```
DIAGNOSTICS-HARD DISK & FLOPPY DISK DUMP : VX.XX
Drive type select (1:FDD, 2:HDD) ?
```

- (b) When FDD is selected, the following message appears. Select a format type number. When HDD is selected, the display will go to step (g).

```
Select drive number (1:A, 2:B) ?
```

- (c) Select a drive number and the following message will be displayed.

```
Format type select (1:2DD, 2:2HD) ?
```

- (d) Select a media type number and the following message will appear:

```
Insert source disk into drive A:
Press any key when ready.
```

- (e) Insert a source disk and press any key and the following message will appear:

```
--- Max. address ---
[ Track ] = XXXX
[ Head  ] = XX
[ Sector ] = XX
Track number ??
```

- (f) Set the track number, head number and sector number you want to dump. The system will access the disk and dump a list and the following message appears. Select
- 3**
- to end the list display.

```
Press number key (1:up, 2:down, 3:end) ?
```

- (g) When HDD is selected in step (a), the following message appears.

```
Select drive number (1:C, 2:d) ?
```

- (h) Select a drive number. Then the following message appears.

```
--- Max. address ---
[ LBA ] = XXXX
LBA number ????????
```

- (i) Enter a LBA number, Then the system accesses the disk and dumps a list.

- (j) The following message appears. Select 3 to end the list display.

```
Press number key (1:up, 2:down, 3:end) ?
```

- (k) The following message appears. Select 2 to return to the FDD UTILITIES menu.

```
Another dump (1:Yes, 2:No) ?
```

5. HDD-ID READ

Selecting HDD ID READ displays the following HDD ID configuration:

```
[HDD ID Read (VX.XX)] [Drive #X]
  ID code (h)           = XXXX
  No. of Cylinders      = XXXX XXXX
  Removable Cylinders  = XXXX XXXX
  No. of Heads         = XXXX XXXX
  Unformat Bytes/Track = XXXX XXXX
  Unformat Bytes/Sector = XXXX XXXX
  Sectors/Track        = XXXX XXXX
  Gap Length           = XXXX XXXX
  Sync. Bytes          = XXXX XXXX
  Reserved (h)         = XXXX
  Serial No.           = YYY...
  Controller Type (h)  = XXXX
  Sector Buffers       = XXXX XXXX
  ECC Bytes            = XXXX XXXX
  Firmware Rev.        = YYYYYY..
  Model No.            = YYYY...
  Reserved (h)         = XXXX
  Double Word Capability = XXXX XXXX
```

Press [Enter] key

Press **Enter** to return to the FDD UTILITIES MENU.

3.27 System Configuration

3.27.1 Function Description

The System Configuration program contains the following configuration information for the computer:

1. Processor Type
2. VGA Controller
3. MS-DOS Version
4. BIOS ROM version (1st ID, 2nd ID)
5. Boot ROM version
6. KBC version
7. PS Microprocessor Version
8. Total Memory Size
9. Battery code
10. Sound System
11. The number of printer ports
12. The number of ASYNC ports
13. The number of math co-processors
14. The number of PCMCIA Slots
15. Modem Type
16. LAN Type
17. The number of floppy disk drives
18. The number of hard disk drives
19. Slim Select Bay Module Type
20. Date/Time

3.27.2 Operations

Selecting **8** from the DIAGNOSTIC MENU and pressing **Enter** displays the following system configuration:

```
System Configuration Display : Ver x.xx [Machine Name :           ]
-----
* - ProcessorType = xx - xxxxx  (?? Step)
** - VGA Controller      = xxxxxx
* - MS-DOS Version      = Vx.xx
* - BIOS-ROM Version    = vx.xx  1st ID = xxH,  2nd ID = xxH
* - BOOT-ROM Version    = vx.xx
* - KBC Version         = Vx.xx
* - PS Micom Version    = Vx.xx  ( EC Version = V1.00 )
* - Total Memory Size   = xxxxxxMB ( Conventional Memory = xxxxxxKB)
* - Battery Code       =
** - Sound System      = YMF753, SB Pro
* - 1 Printer Adapter   LPT1=0378  LPT2=          LPT3=
* - 1 ASYNC Adapter     COM1=03F8  COM2=          COM3=
* -
* - 1 Math CO-Processor
* - 2 PCMCIA Slot
* - Modem / LAN        = xxxxx

* - 1 Floppy Disk Drive(s)      Track =000          Sector =18
* - 1 Hard Disk Drive(s)        #1 Sectors =xxxxxxxxx  (xxxGB)
                                #2 Sectors =          (   GB)

* - Selective Bay Unit = xxxxx

Press [Enter] Key                [ Date= yyyy-mm-dd, hh:mm:ss ]
```

Press **Enter** to return to the DIAGNOSTIC MENU.

3.28 SETUP

3.28.1 Function Description

This program displays the current system setup information as listed below:

1. Memory
 - (a) Total
2. System Date/Time
 - (a) Date
 - (b) Time
3. Battery
 - (a) Battery Save Mode
4. Password
5. HDD Password
 - (a) HDD
 - (b) HDD Password Mode
 - (c) User Password
6. Boot Priority
 - (a) Boot Priority
 - (b) HDD Priority
 - (c) Network Boot Protocol
7. Display
 - (a) Power On Display
 - (b) LCD Display Stretch
 - (c) TV Type
8. Others
 - (a) Power-up Mode
 - (b) CPU Cache
 - (c) Level 2 Cache
 - (d) Dynamic CPU Frequency Mode
 - (e) Auto Power On
9. Configuration
 - (a) Device Config.
10. I/O Ports
 - (a) Serial
 - (b) Parallel

- 11. Drives I/O
 - (a) Built-in HDD
 - (b) Select Bay

- 12. PCI Bus
 - (a) PCI Bus

- 13. PC Card
 - (a) Controller Mode

- 14. Peripheral
 - (a) Internal Pointing Device
 - (b) Parallel Port Mode
 - (c) Hard Disk Mode

- 15. Legacy Emulation
 - (a) USB keyboard/Mouse Legacy Emulation
 - (b) USB-FDD Legacy Emulation

- 16. PCI LAN
 - (a) Built-in LAN

3.28.2 Accessing the SETUP Program

Selecting **0** from the DIAGNOSTICS MENU and pressing **Enter** displays the TSETUP screen. The TSETUP screen is divided into two pages: SYSTEM SETUP (1/2) and SYSTEM SETUP (2/2).

SYSTEM SETUP (1/2)		ACPI BIOS version - x.xx
MEMORY Total = xxxxxxKB		BOOT PRIORITY Boot Priority = HDD→FDD→CD-ROM→LAN HDD Priority = Built-in HDD→Second HDD→PC Card Network Boot Protocol = PXE
SYSTEM Date/TIME Date (MM-DD-YYYY) = mm-dd-yyyy Time (HH:MM:SS) = hh:mm:ss		DISPLAY Power On Display = Auto-Selected LCD Display Stretch = Enabled TV Type = NTSC(US)
BATTERY Battery Save Mode = Full Power		OTHERS Power-up Mode = Boot CPU Cache = Enabled Level 2 Cache = Enabled Dynamic CPU Frequency Mode = Dynamically Switchable Auto Power On = Disabled Panel Power On/Off = Disabled
PASSWORD Not Registered		
HDD PASSWORD HDD = Build-in HDD HDD Password Mode = User Only User Password = Not Registered		

↑↓←→:Select items Space,BkSp:Change values PgDn,PgUp:Change pages
 Esc:Exit without saving Home:Set default values End:Save changes and Exit

SYSTEM SETUP (2/2)		ACPI BIOS version - x.xx	
<p>CONFIGURATION</p> <p>Device Config. = Setup by OS</p>		<p>PC CARD</p> <p>Controller Mode = Auto-Selected</p>	
<p>I/O PORTS</p> <p>Serial = COM1 (3F8H/IRQ4)</p> <p>Parallel = LPT1 (378H/IRQ7/CH3)</p>		<p>PERIPHERAL</p> <p>Internal Pointing Device = Enabled</p> <p>Ext Keyboard "Fn" = Disabled</p> <p>Parallel Port Mode = ECP</p> <p>Hard Disk Mode = Enhanced IDE (Normal)</p>	
<p>DRIVES I/O</p> <p>Built-in HDD = Primary IDE (1F0H/IRQ14)</p> <p>Select Bay = Secondary IDE (170H/IRQ15)</p>		<p>LEGACY EMULATION</p> <p>USB KB/Mouse Legacy Emulation = Enabled</p> <p>USB-FDD Legacy Emulation = Enabled</p>	
<p>PCI BUS</p> <p>PCI BUS = IRQ10, IRQ11</p>		<p>PCI LAN</p> <p>Built-in LAN = Enabled</p>	

↑↓←→:Select items Space,BkSp:Change values PgDn,PgUp:Change pages
 Esc:Exit without saving Home:Set default values End:Save changes and Exit

NOTE:

1. Panel Power On/Off item appears only when the Power-up Mode is in Resume mode.
2. The USB FDD Legacy Emulation item appears under the LEGACY EMULATION item only when Floppy Disk I/O is set to Disabled.
3. The LCD Display Stretch item appears under the Display item only when the LCD screen resolution is XGA (1024×768 LCD).

Moving Within the SETUP Menu and Changing Values

1. Press ← and → to move between the two columns. Press **PgDn** and **PgUp** to move between the two pages. Press ↑ and ↓ to move between items in a column.
2. Press either the **space bar** to change the value.

Accepting Changes and Exiting the SETUP Window

1. Press **End** to accept the changes you made.

The following message is displayed:

```
Are you sure? (Y/N)
The changes you made will cause the system to reboot.
```

2. To make other changes, press **N**. Repeat the steps above.
3. To accept the changes, press **Y**.

NOTE: You can press **Esc** to quit at any time without saving changes. *SETUP* asks you to confirm that you do not want to save your changes toward User.

The Factory Preset Configuration

When you access *SETUP*, the current configuration is displayed.

1. To show the factory preset configuration, press **Home**.
2. Press **End** and then press **Y** to accept the factory preset settings.

NOTE: When you execute the default setting, the following settings are not changed:

```
HDD Mode
Password
Write Policy in the CPU Cache
```

SETUP Options

The SETUP screen is divided into functionally related groups. This section describes each group and its options.

1. Memory

This group of options displays the computer's memory.

(a) Total

This field displays the total amount of memory installed and is automatically calculated by the computer. You cannot change this value.

2. System Date/Time

Use this option to set the computer's system date/time. Press ↓ to move the cursor to the right and press ↑ to move the cursor to the left. Press the **space bar** to increase the number and press **BkSp** to decrease the number.

(a) System Date

Use this option to set the system date of the computer.

(b) System Time

Use this option to set the system time of the computer.

3. Battery

This option is used to select the battery setting.

(a) Battery Save Options

The following set of options can be selected in the submenu.

Processing Speed

This feature changes the CPU processing speed.

High CPU operates at high speed. (Default)

Low CPU operates at low speed.

CPU Sleep Mode

Use this option to enable or disable the CPU sleep function.

Enabled Enables sleep mode. (Default)

Disabled Disables sleep mode.

Display Auto Off

Use this option to disable or set the duration of the display automatic power off function. This function causes the computer to turn the LCD panel's illumination off if you make no entry for the set period of time.

Disabled Disables display automatic power off.

xx Min. Automatically turns off power to the LCD panel's illumination if the panel is not used for the duration set. The duration **xx** can be set to **1, 3, 5, 10, 15, 20** or **30** minutes.

HDD Auto Off

Use this option to set the duration of the HDD automatic power off function.

xx Min. Automatically turns off power to the hard disk drive if it is not used for the duration set. The duration **xx** can be set to **1, 3, 5, 10, 15, 20** or **30** minutes.

LCD Brightness

Use this option to set the level of LCD brightness.

Super-Bright Full brightness for maximum visibility.

Bright Full brightness for high visibility.

Semi-Bright Less than full brightness for saving power.

Cooling Method

If the CPU becomes too hot, the fan turns on or the processing speed is lowered automatically. When the CPU temperature falls to a normal range, the fan turns off.

Maximum performance Turns on fan first, then if necessary lowers CPU processing speed.

Battery optimized Lowers the CPU processing speed first, then if necessary turns on the fan.

4. Password

This option allows you to set or reset the user password for power on.

Not Registered Change or remove the password. (Default)

For details on setting the user password refer to the User's Manual.

5. HDD Password

This group of options displays the HDD password. You cannot change these values.

- (a) HDD
- (b) HDD Password Mode
- (c) User Password

6. Boot Priority

This tab sets the priority for booting the computer and the priority for the built-in HDD or optional secondary HDD.

(a) Boot Priority

- HDD→FDD→CD-ROM→LAN:** The computer looks for bootable files in the following order: HDD,FDD, CD-ROM and LAN. (Default)
- FDD→HDD→CD-ROM→LAN:** The computer looks for bootable files in the following order: FDD,HDD, CD-ROM and LAN.
- HDD→CD-ROM→LAN→FDD:** The computer looks for bootable files in the following order: HDD, CD-ROM, LAN and FDD.
- FDD→CD-ROM→LAN→HDD:** The computer looks for bootable files in the following order: FDD, CD-ROM, LAN and HDD.
- CD-ROM→LAN→HDD→FDD:** The computer looks for bootable files in the following order: CD-ROM LAN HDD and FDD.
- CD-ROM→LAN→FDD→HDD:** The computer looks for bootable files in the following order: CD-ROM LAN FDD and HDD.

NOTE: CD-ROM refers to a DVD-ROM, CD-RW/DVD, DVD-R/RW or DVD-Multi drive.

(b) HDD Priority

This option enables to select the priority for the Built-in HDD, optional second HDD or PC card.

Built-in HDD → Second HDD → PC Card (Default)

Second HDD → Built-in HDD → PC Card

Built-in HDD → PC Card → Second HDD

Second HDD → PC Card → Built-in HDD

PC Card → Built-in HDD → Second HDD

PC Card → Second HDD → Built-in HDD

(c) Network Boot Protocol

Use this option to set the starting method via a network.

PXE Sets to PXE protocol (Default)

RPL Sets to PRL protocol

7. Display

This group of options configures the computer's display.

(a) Power On Display

This option is used to select the display when booting up.

Auto-Selected Selects an external monitor if one is connected. Otherwise it selects the internal LCD. (Default)

LCD+AnalogRGB Selects both the internal LCD and the external monitor for simultaneous display.

NOTE: When starting the computer in Resume mode, the last configuration is remembered. If data does not appear on the display you are using after starting in Resume mode, pressing **Fn+F5**.

Pressing **Fn+F5** changes the display setting in the order of internal LCD to simultaneous to external monitor.

(b) LCD Display Stretch

LCD Display Stretch enables or disables a larger display area of the screen.

Enabled Enables the LCD display stretch feature. (Default)

Disabled Disables the LCD display stretch feature.

(c) TV Type

This option lets you make settings for television display.

NTSC(US) (Default)

NTSC(JAPAN)

PAL

8. Others

Whether or not you need to configure the computer with these options depends primarily on the kind of software or peripherals you use.

(a) Power-up Modes

Use this option to choose between resume and boot mode. This option can also be set by hotkeys.

Boot Turns on boot mode. (Default)

Resume Turns on resume mode.

(b) CPU Cache

Use this option to enable or disable the CPU cache.

Enabled Enables the CPU cache. (Default)

Disabled Disables the CPU cache.

When enabled is selected, a subwindow similar to the one below is displayed to select the cache write policy. The options for this setting are **Write-back** (default) and **Write-through** for CPU cache.

OPTION	
Write policy	= Write-back

Write-back policy provides better system performance, because main memory is accessed only when necessary to update the cache contents with changes in main memory. Write-through policy accesses main memory every time data is handled by the processor.

(c) Level 2 Cache

Use this option to enable or disable the level 2 cache.

Enabled Enables the level 2 cache. (Default)

Disabled Disables the level 2 cache.

(d) Dynamic CPU Frequency Mode

Use this option to choose from the following settings:

Dynamically Switchable Enables the dynamic CPU frequency change function.

Always High Disables the dynamic CPU frequency change function and always runs the processor at its maximum speed.

Always Low Disables the dynamic CPU frequency change function and always runs the processor at its default speed.

(e) Auto Power On

Use this option to set a time and date for automatic power on and enable or disable the ring indicator feature. **Ring Indicator** displays only when the computer is in Resume mode and the **Alarm Date Option** displays when **Alarm Time** is enabled.

OPTIONS

Alarm Time	= 00:00:00
Alarm Date Option	= Disabled
Ring Indicator	= Disabled*
Wake-up on LAN	= Disabled**

* only for Modem Model **only for LAN Model

Alarm Time is set in the sequence of hours and minutes. Seconds cannot be changed. **Alarm Date Option** is set in the sequence of month and day. If Alarm Date is set to Disabled, the computer will be powered on at the same time every day. Press ↓ to move the cursor to the right and ↑ to move the cursor to the left when you set the date and time.

- NOTE:**
1. Do not remove the AC adaptor and battery pack at the same time when you use this feature. If you do so, data saved by the resume function will be lost. You must also reset this option.
 2. If you have set a password and the computer boots by the Auto Power On function and Resume is on, the computer will start with the instant security function enabled. The **password =** message is not displayed; however, you must enter the password to use the computer.

(f) Panel Power On/Off

This option lets you set the Panel Power On/Off function. It is effective only in Resume mode.

Enabled Enables the Panel Power On/Off.

Disabled Disables the Panel Power On/Off (Default)

9. Configuration

This field displays the configuration method.

The devices are initialized when the PNP OS loads.

Setup by OS First, devices necessary for loading the OS will be initialized. After the PNP OS loads, other devices will be initialized by the OS. In this case, setup of PC Cards will be fixed to “Auto-Selected,” and cannot be changed. (Default)

All Devices All devices will be initialized.

If you are using an OS that does not have PNP capacity, select “All Devices.”

The Display shows the following message:

Device Config. = All Devices

10. I/O ports

This option controls settings for the serial and parallel ports and the sound system.

NOTE: Do not assign the same interrupt request level and I/O address to the serial port and PC card.

(a) Serial

Use this option to set the COM level for the serial port. The serial port interrupt request level (IRQ) and I/O port base address for each COM level is shown below:

COM level	Interrupt level	I/O address	
COM1	4	3F8H	(Serial port default)
COM2	3	2F8H	
COM3	4	3E8H	
COM3	5	3E8H	
COM3	7	3E8H	
COM4	3	2E8H	
COM4	5	2E8H	
COM4	7	2E8H	
Not Used	Disables port		

(b) Parallel

This option sets the interrupt request level (IRQ) and I/O port base address for the parallel port. When the Printer Port Mode is set to **Std. Bi-direct**, the options are:

LPT setting	Interrupt level	I/O address
LPT 1	7	378H
LPT 2	5	278H
LPT 3	7	3BCH
Not Used	Disables port	

When the Printer Port Mode (see settings below) is set to **ECP**, the DMA channel can also be set to **1**, **2** or **3**. The default is 3.

LPT setting	Interrupt level	I/O address	DMA channel
LPT 1	7	378H	3 (Parallel port default)
LPT 2	5	278H	3
LPT 3	7	3BCH	3
Not Used	Disables the port		

When you select one of the above options, except for **Not Used**, a subwindow similar to the one below appears to let you set the DMA. The options for this setting are Channel 1 and Channel 3 (Default).

OPTIONS	
DMA	= Channel 3 (Default)

For most printers, the port should be set to **ECP**. With some other parallel devices, the setting should be **Std. Bi-Direct**.

11. Drives I/O

This option displays the address and interrupt level for hard disk drive, CD/DVD-ROM drive and PC card. It is for information only and cannot be changed.

(a) Built-in HDD

Primary IDE (1F0H/IRQ14) The Built-in HDD is ready for use.

No Drive The Built-in HDD is not installed.

(b) Select Bay

This option is displayed only when the hard disk drive or optical disk drive is installed to the select bay. **Secondary IDE (170H/IRQ15)** Computer Selectable Bay HDD.

(c) PC Card

When an ATA card is installed in IN13h, the sub window below is displayed.

DRIVES I/O	
Built-in HDD	= Primary IDE (1F0H/IRQ14)
ATA Card	= Others (190H/IRQ)

12. PCI Bus

This item displays the interrupt level for the Card Bus. It is for information only and cannot be changed.

PCI BUS = IRQ10, IRQ11

13. PC Card

This option displays the PC Card Controller mode. It is for information only and cannot be changed.

Controller Mode = Auto-Selected

14. Peripheral

Use this option to select the parallel port mode and hard disk mode.

(a) Internal Pointing Device

This option enables and disables the Touch Pad and accupoint.

Enabled Enables the Touch Pad and accupoint. (Default)

Disabled Disables the Touch Pad and accupoint.

(b) Ext Keyboard "Fn"

Use this option to set the Fn key equivalent when you are using an external keyboard. Selecting this option displays the following subwindow.

Enabled Enables the feature.

KEYBOARD
Ext Keyboard "Fn" key equivalent = Left Ctrl + Left Alt

Use this option to set a key combination on an external keyboard to emulate the **Fn** key on the computer's internal keyboard. Setting an **Fn** key equivalent will enable you to use "Hotkeys" by pressing the set combination in place of the **Fn** key. The following items can be selected for this option:

Left Ctrl + Left Alt*

Right Ctrl + Right Alt*

Left Alt + Left Shift

Right Alt + Right Shift

Left Alt + Caps Lock

*If these selections are made, you cannot warm boot the system by pressing **Ctrl + Alt + Del**.

Disabled Disables the feature. (Default)

(c) Parallel Port Mode

The options in this tab are ECP and Standard Bi-directional.

ECP Sets the port mode to Extended Capabilities Port (ECP). For most printers, the port should be set to ECP. (Default)

Std. Bi-Direct.

This setting should be used with some other parallel devices.

(d) Hard Disk Mode

Use this item to select the hard disk mode.

Enhanced IDE (Normal) Select this mode when using an operating system that supports Enhanced IDE. (Default)

Standard IDE Select this mode when using an operating system that does not support Enhanced IDE.

***NOTE:** Formats for Enhanced IDE and Standard IDE are different, so if you change the setting, you will have to reformat the hard disk for the appropriate setting.*

15. Legacy Emulation

(a) USB keyboard/Mouse Legacy Emulation.

Use this option to enable or disable USB KB/Mouse Legacy Emulation. If your operating system does not support USB, you can still use a USB mouse and keyboard by setting the **USB KB/Mouse Legacy Emulation** item to **Enabled**.

Enabled USB Legacy Support can be used. (Default)

Disabled USB Legacy Support cannot be used.

(b) USB-FDD Legacy Emulation.

Use this option to enable or disable USB-FDD Legacy Emulation.

Enabled USB Legacy Support can be used. (Default)

Disabled USB Legacy Support cannot be used.

16. PCI LAN

This option enables/disables the Built-in LAN functions.

(a) Built-in LAN

- | | |
|-----------------|---|
| Enabled | Enables Built-in LAN functions. (Default) |
| Disabled | Disables Built-in LAN functions. |

Chapter 4

Replacement Procedures

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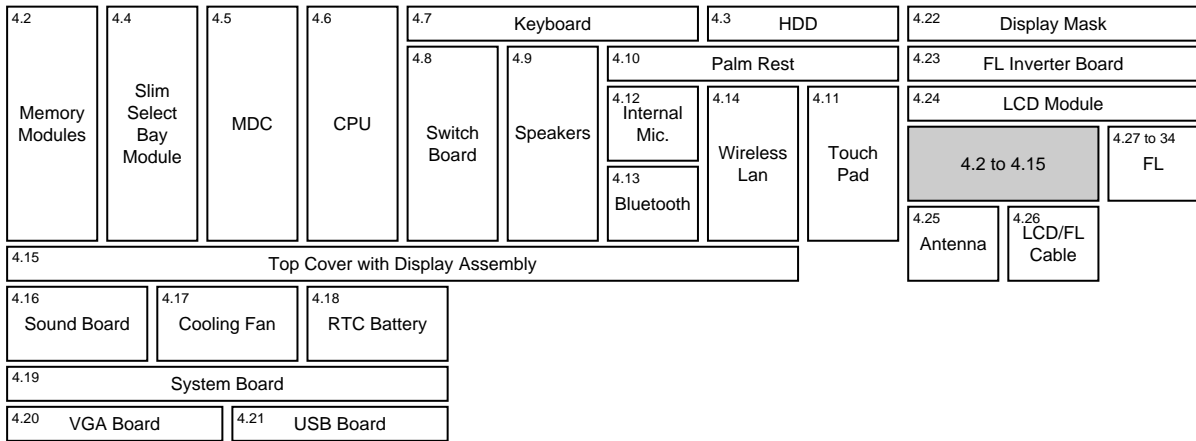
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4.1 General

This section explains how to disassemble the computer and replace Field Replaceable Units (FRUs). It may not be necessary to remove all the FRUs in order to replace one. The chart below is a guide to which FRUs need to be removed in order to remove others. Always start by removing the battery pack, next, optional items such as the optional PC card, optional mini PCI card and optional memory module, then follow the line on the chart to determine which FRU you must remove next in order to repair the one you think is causing the computer to operate improperly. Refer to the example at the bottom of the page.



How to See the Chart

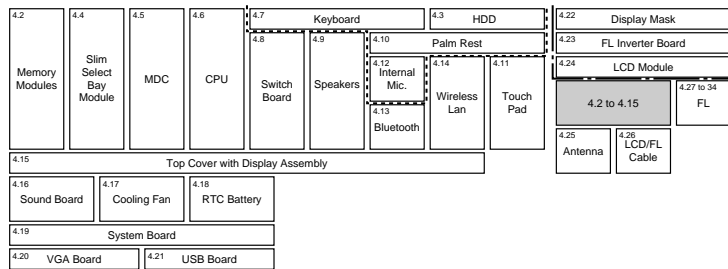
Two examples of referring to the chart are shown below.

•Removing the Internal Microphone

You have to remove the HDD, keyboard, and palm rest before removing the internal microphone.

•Removing the LCD Module

You have to remove the display mask and FL inverter board before removing the LCD module.



----- Internal Mic.
 ———— LCD Module

Safety Precautions

Before you begin disassembly, read the following safety precautions and observe them carefully as you work.

- DANGER:**
1. *Always use the genuine battery that is authorized by TOSHIBA or compatible with the unit. Since other battery packs have different specifications, they may be incompatible with the unit, and may burst or explode.
Never heat or disassemble the battery pack, as that could cause leakage of alkaline solution. Never throw the battery pack into a fire, as that could cause the battery pack to explode.*
 2. *The power supply, FL inverter and other components carry high voltages. If you need to turn on the power of a partially disassembled computer to check its operation, be very careful not to touch connectors or components, in order to avoid the risk of electric shock. Also, do not disassemble individual components in first-level maintenance.*

- WARNING:**
1. *Turn off the power and disconnect the AC adaptor from the power source, to avoid exposure to electric shock.*
 2. *Batteries in the computer retain an electrical charge, so there is danger of electrical shock even when the computer is disconnected from an AC power source. Remove any metal jewelry or accessories such as necklaces, bracelets or rings, in order to reduce the risk of electric shock. Never work with wet or damp hands.*
 3. *Be careful of edges and corners as these may cut.*

- CAUTION:**
1. *When you change a component, be sure the replacement component meets the required specifications. Never use foreign parts, to avoid any risk of damage to the computer.*
 2. *To avoid any risk of short-circuit, fire or other internal damage, never allow any metal objects such as screws or paper clips to fall into the unit. Be sure to replace screws with the same size as those removed. Make sure all screws are securely fastened. Loose screws can cause short circuits, resulting in heat, smoke or fire.*
 3. *Before lifting out an FRU or other component, make sure all cables to the component have been disconnected, in order to reduce the risk of accidental electric shock.*
 4. *If you use AC power, be sure to use the cable that came with the computer or one recommended by TOSHIBA.*
 5. *Make sure that all replacement components meet the specifications for the computer and that all cables and connectors are securely fastened, in order to avoid the risk of electric shock.*
 6. *Some parts inside the computer, such as the CPU and cooling module, become very hot during operation. Conduct repair work after they have cooled. Be careful around the CPU and cooling module to avoid burns.*

Before You Begin

Look over the procedures in this section before you begin disassembling the computer. Familiarize yourself with the disassembly and reassembly steps. Begin each procedure by removing the AC adapter and the battery pack as instructed in this section:

1. Do not disassemble the computer unless it is operating abnormally.
2. Use only the correct and approved tools.
3. Make sure the working environment is free from the following elements whether you are using or storing the computer.
 - Dust and contaminants
 - Static electricity
 - Extreme heat, cold and humidity
4. Make sure the FRU you are replacing is causing the abnormal operation by performing the necessary diagnostics tests described in this manual.
5. Do not perform any operations that are not necessary and use only the described procedures for disassembling and installing FRUs in the computer.
6. After removing parts from the computer, place them in a safe place away from the computer so they will not be damaged and will not interfere with your work.
7. You will remove and replace many screws when you disassemble the computer. When you remove screws, make sure they are placed in a safe place and identified with the correct parts.
8. When assembling the computer make sure you use the correct screws to secure the various pieces in place. Screw sizes are listed in their corresponding figures.
9. The computer contains many sharp edges and corners, so be careful not to injure yourself.
10. After you have replaced an FRU, make sure the computer is functioning properly by performing the appropriate test on the FRU you have fixed or replaced.

Disassembly Procedures

The computer has three basic types of cable connectors:

- Pressure Plate Connectors
- Coaxial Cable Connectors
- Normal Pin Connectors

To disconnect a Pressure Plate connector, lift up the tabs on either side of the connector's plastic pressure plate and slide the cable out of the connector. To connect the cable to a Pressure Plate connector, make sure the pressure plate is fully lifted and slide the cable into the connector. Secure the cable in place by pushing the sides of the pressure plate down so the plate is flush with the sides of the connector. Gently pull on the cable to make sure the cable is secure. If you pull out the connector, connect it again making sure the connector's pressure plate is fully lifted when you insert the cable.

Coaxial cables should be disconnected with an antenna coaxial disconnecter.

Standard pin connectors are used with all other cables. These connectors can be connected and disconnected by simply pulling them apart or pushing them together.

Assembly Procedures

After you have disassembled the computer and fixed or repaired the problem that was causing the computer to operate abnormally, you will need to reassemble the computer.

Install all the removed FRUs following the steps described in the corresponding sections in this chapter.

While assembling the computer, remember the following general points:

- Take your time, making sure you follow the instructions closely. Most problems arise when you get in a hurry assembling the computer.
- Make sure all cables and connectors are securely fastened.
- Before securing the FRU or other parts, make sure that screws or the FRU will pinch no cables.
- Check that all latches are closed securely in place.
- Make sure all the correct screws are used to secure all FRUs. Using the wrong screw can either damage the threads on the screw or the head of the screw and may prevent proper seating of an FRU.

After installing an FRU in the computer, confirm that the FRU and the computer are functioning properly.

Tools and Equipment

The use of Electrostatic Discharge (ESD) equipment is very important for your safety and the safety of those around you. Proper use of these devices will increase the success rate of your repairs and lower the cost for damaged or destroyed parts. The following equipment is necessary to disassemble and reassemble the computer:

- One M2 point size 0 Phillips screwdriver to remove and replace screws.
- One 4 mm flat-blade screwdriver.
- Tweezers, to lift out screws that you cannot grasp with your fingers.
- ESD mats for the floor and the table you are working on.
- An ESD wrist strap or heel grounder.
- Anti-static carpeting or flooring.
- Air ionizers in highly static sensitive areas.
- Plastic card of the size of credit card.
- Antenna coaxial cable disconnecter

Screw Tightening Torque

When you fasten screws, be sure to follow the torque list below.

CAUTION: Overtightening can damage components and screws; undertightening can result in electrical shorts or other damage if screws or components come loose.

NOTE: TOSHIBA recommends that you use an electric screw driver for quick and easy operations.

- | | |
|---|------------------------|
| <input type="checkbox"/> M2 | 0.17 N·m (1.7 kgf·cm) |
| <input type="checkbox"/> M2.5 | 0.30 N·m (3.0 kgf·cm) |
| <input type="checkbox"/> M3 | 0.57 N·m (5.6 kgf·cm) |
| <input type="checkbox"/> M2.5×4 PSP TITE | 0.204 N·m (2.0 kgf·cm) |
| <input type="checkbox"/> M2.5×6 GIZA TITE | 0.30 N·m (3.0 kgf·cm) |
| <input type="checkbox"/> LCD (internal use) | |
| DTI 14.1 inch | 0.153 N·m (1.5 kgf·cm) |
| Sharp | 0.092 N·m (0.9 kgf·cm) |

NOTE: The computer contains several flat-head screws. These screws have less contact area with the screwdriver, so be careful to press firmly enough to prevent the screwdriver from slipping out and damaging the screw head.

Color of Screw Shaft

To avoid mistakes on the screw length, screw shafts are colored as follows:

- Even number length screw: brown
- Odd number length screw: white
- Special length screw: blue
Screws whose lengths are indicated to one or more decimal places such as 2.5 mm or 2.8 mm.

Marking of Screws on the Computer Body

To make maintenance of the computer easier, markings of the kinds of the screws including the types and lengths of the screws are indicated on the computer body.

Kind of screws	Symbol
<input type="checkbox"/> Bind screw	B
<input type="checkbox"/> Flat-head screw	F
<input type="checkbox"/> Super flat-head screw	S
<input type="checkbox"/> Tapping screw	T
<input type="checkbox"/> Other screws (Unique screws, stud, etc.)	U

Examples:

- 6 mm bind screw B6
- 12 mm bind screw B12
- 5 mm stud U5
(Indicates the screwed length in round number regardless the length of the stud.)

Removing the Battery Pack

To remove the battery pack, follow the steps below and refer to Figure 4-1.

CAUTION: When handling battery packs, be careful not to short circuit the terminals. Also do not drop, hit or otherwise apply impact; do not scratch or break the casing and do not twist or bend the battery pack.

1. Turn the computer upside down.
2. Slide the **battery latch** toward the front to release it, then rotate the **battery pack** from the right and lift it out.

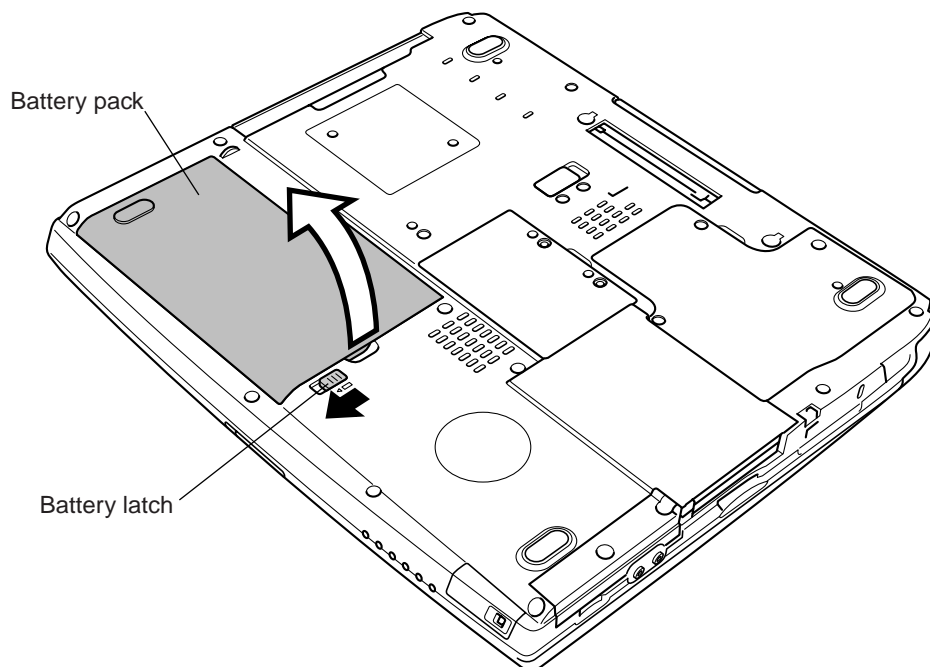


Figure 4-1 Removing the battery

NOTE: For environmental reasons, do not throw away a spent battery pack. Please return the spent battery packs to TOSHIBA.

Installing the Battery Pack

To install the battery pack, follow the steps below and refer to Figure 4-1.

CAUTION: *The battery pack is a lithium ion battery, which can explode if not properly replaced, used, handled or disposed of. Dispose of the battery as required by local ordinances or regulations. Use only batteries recommended by TOSHIBA as replacements.*

NOTE: *Check the battery's terminals visually. If they are dirty, wipe them clean with a dry cloth.*

1. Seat the **battery pack** in the computer and secure it with the latch.

Removing an Optional PC Card

To remove a PC Card (option), follow the steps below and refer to Figure 4-2.

CAUTION: Before you remove a PC Card, refer to the card's documentation and to your operating system documentation for proper procedures and precautions.

1. Turn the computer right side up.
2. Press the **eject button** for the **PC Card** you want to remove to extend the button.
3. Press the extended **eject button** to pop the **PC Card** out slightly.
4. Grasp the **PC Card** and pull it out.

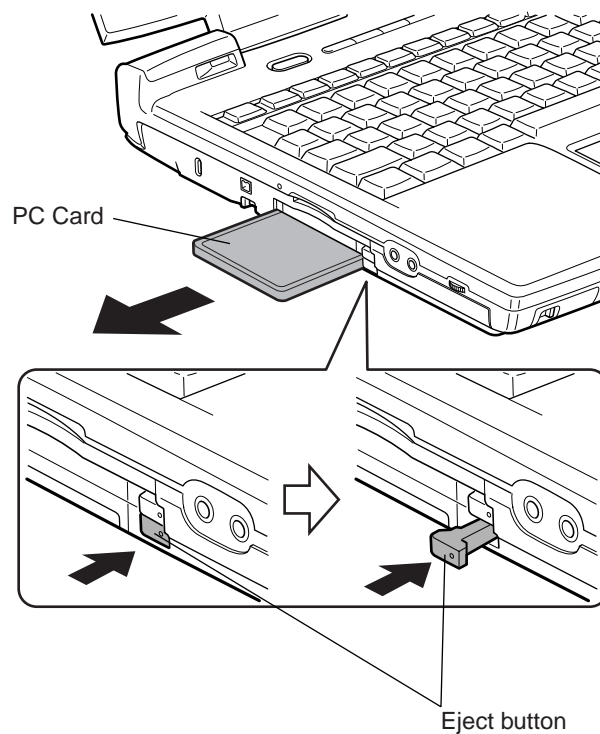


Figure 4-2 Removing a PC Card

Installing an Optional PC Card

To install a PC Card, follow the steps below and refer to Figure 4-2.

1. Insert a **PC Card**.
2. Push it carefully to ensure a firm connection.

Removing an Optional SD Card

To remove an SD card (option), follow the steps below and refer to Figure 4-3.

CAUTION: Before you remove an SD card, refer to the card's documentation and to your operating system documentation for proper procedures and precautions.

1. Turn the computer right side up.
2. Push the **SD card** in and release it to pop the card out slightly.
3. Grasp the **SD card** and pull it out.

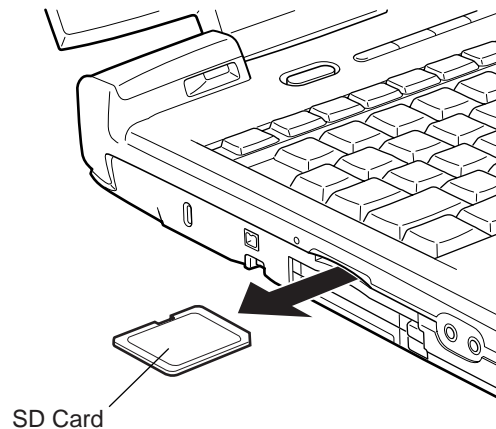


Figure 4-3 Removing an SD card

Installing an Optional SD Card

To install an SD card (option), follow the steps below and refer to Figure 4-3.

1. Insert an **SD card**.
2. Push it carefully to ensure a firm connection.

4.2 Memory Modules

Removing a Memory Module

To remove a memory module make sure the computer is in boot mode and powered off, follow the steps below and refer to Figures 4-4 and 4-5.

CAUTION: Do not try to remove a memory module with the computer turned on. You can damage the computer and the memory.

1. Turn the computer upside down.
2. Remove **two M2×4 black flat-head screws** from the memory slot cover.
3. Lift off the **memory slot cover**.

CAUTION: Do not touch the connectors on the memory module(s) or on the computer. Debris on the connectors may cause memory access problems.

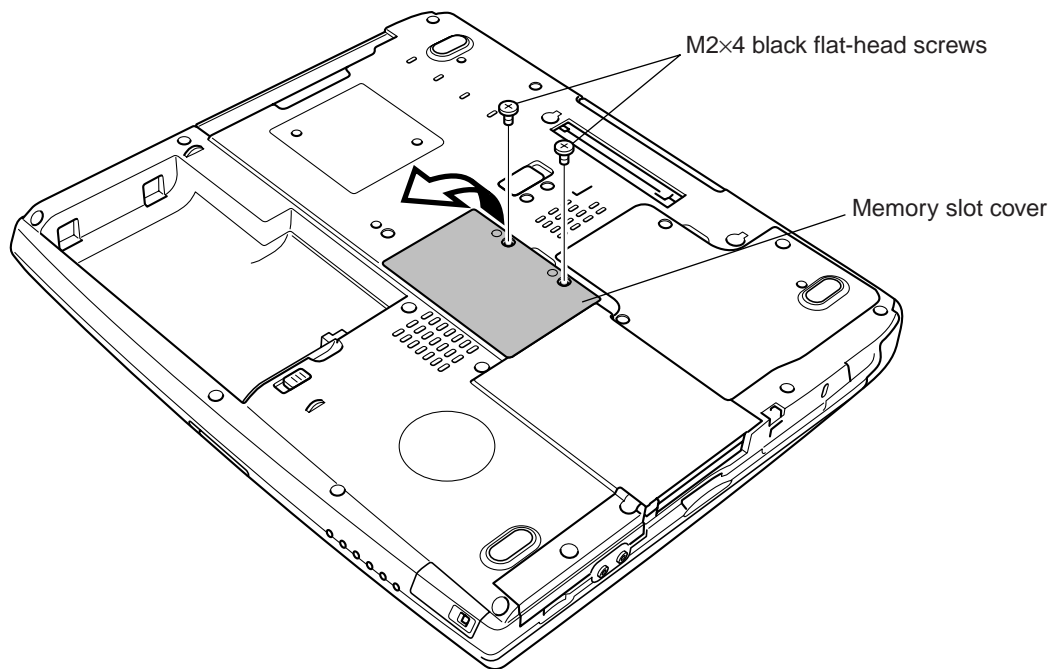


Figure 4-4 Removing the memory slot cover

4. Gently press out on **two latches**. One end of the **memory module** will pop up.
5. Grasp the **memory module** and pull it out.

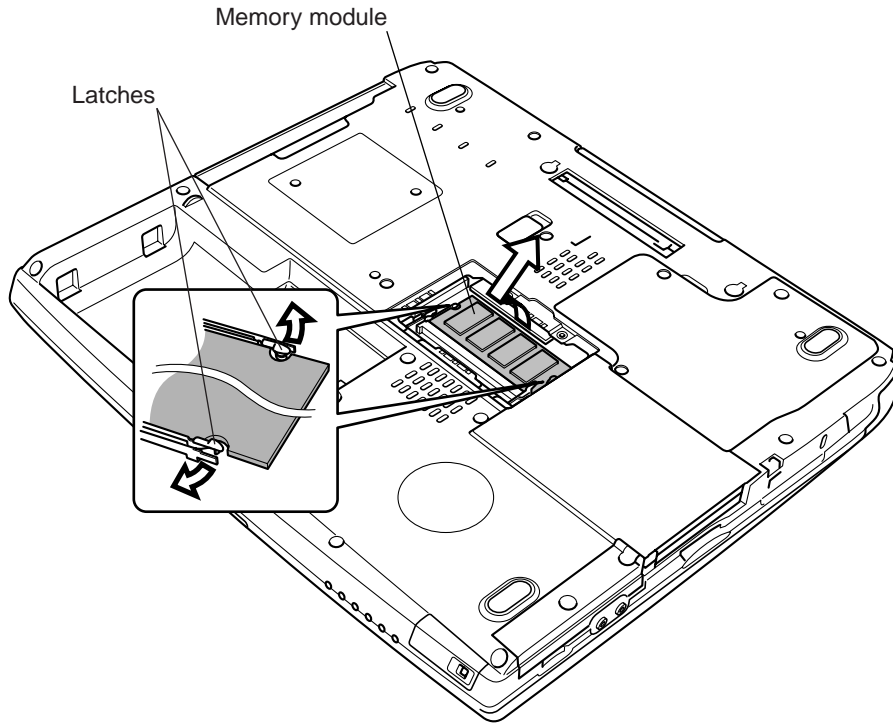


Figure 4-5 Removing the memory modules

Installing a Memory Module

To install a memory module, make sure that the computer is in boot mode and powered off, follow the steps below and refer to Figures 4-4 and 4-5.

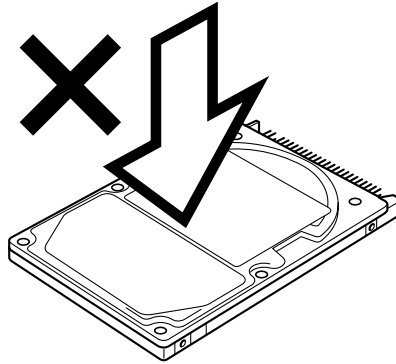
CAUTION: *Do not touch the connectors on the memory module or on the computer.
Debris on the connectors may cause memory access problems.*

1. Fit the **memory module**'s connectors into the computer's connectors and press carefully to ensure firm contact.
2. Gently, push the **memory module** down until **latches** on either side engage the **memory module** to hold it in place.
3. Align two tabs on the edge of the **memory slot cover** with two notches on the memory slot, and seat the **memory slot cover**.
4. Secure the **memory slot cover** with **two M2.5×4 black flat-head screws**.

CAUTION: *Do not install a memory module in slot B only. Use slot A prior to slot B.
Otherwise, the computer or the memory may be damaged.*

4.3 HDD

CAUTION: When handling the HDD, do not press the top surface as shown by the arrow. Hold it by the sides.



Removing the HDD

To remove the HDD, follow the steps below and refer to Figures 4-6 to 4-8.

1. Turn the computer upside down.
2. Remove **two M2.5×12 black flat-head screws** securing the **HDD cover**.
3. Lift off the **HDD cover**.

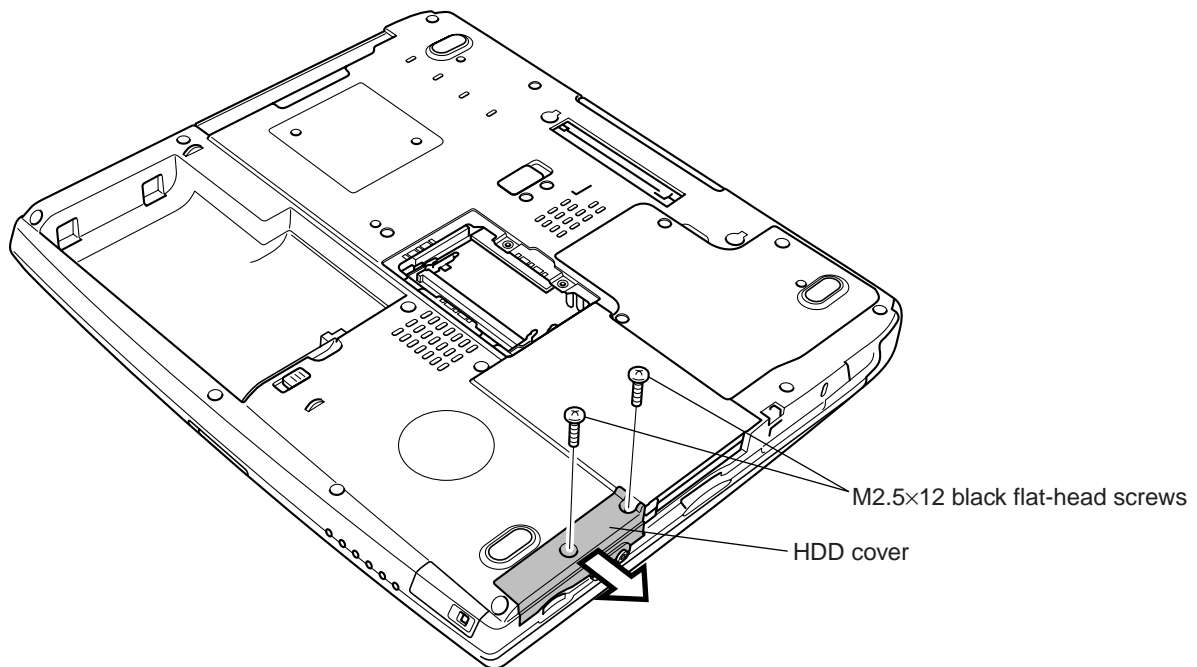


Figure 4-6 Removing the HDD cover

4. Pull the **HDD** gently out of the slot.

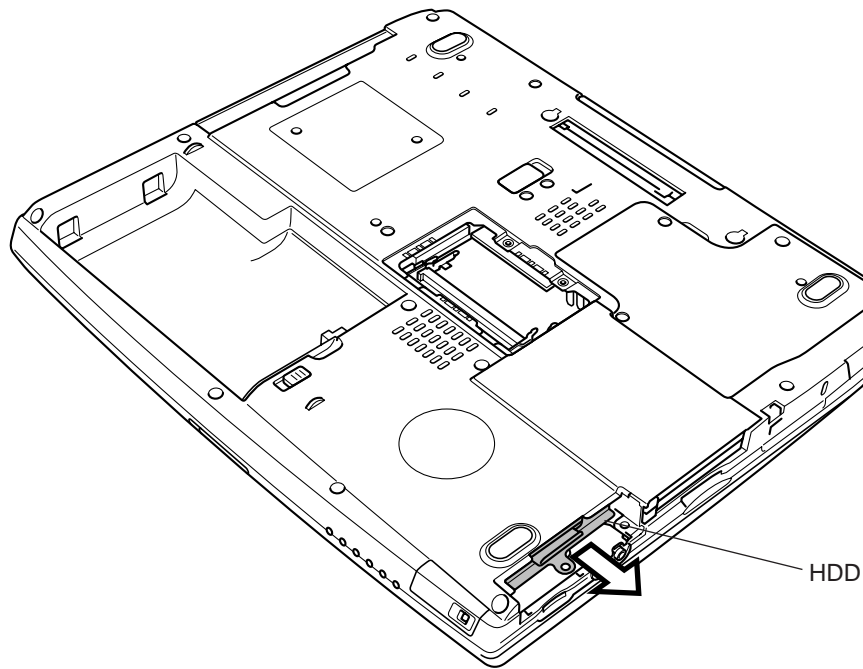


Figure 4-7 Removing the HDD pack

NOTE: The following steps describe how to disassemble the HDD pack; however, do not disassemble if the HDD is working properly.

5. Place the **HDD** pack on a flat surface, and remove **four M3×4 silver flat-head screws**.
6. Remove the **HDD bracket**.

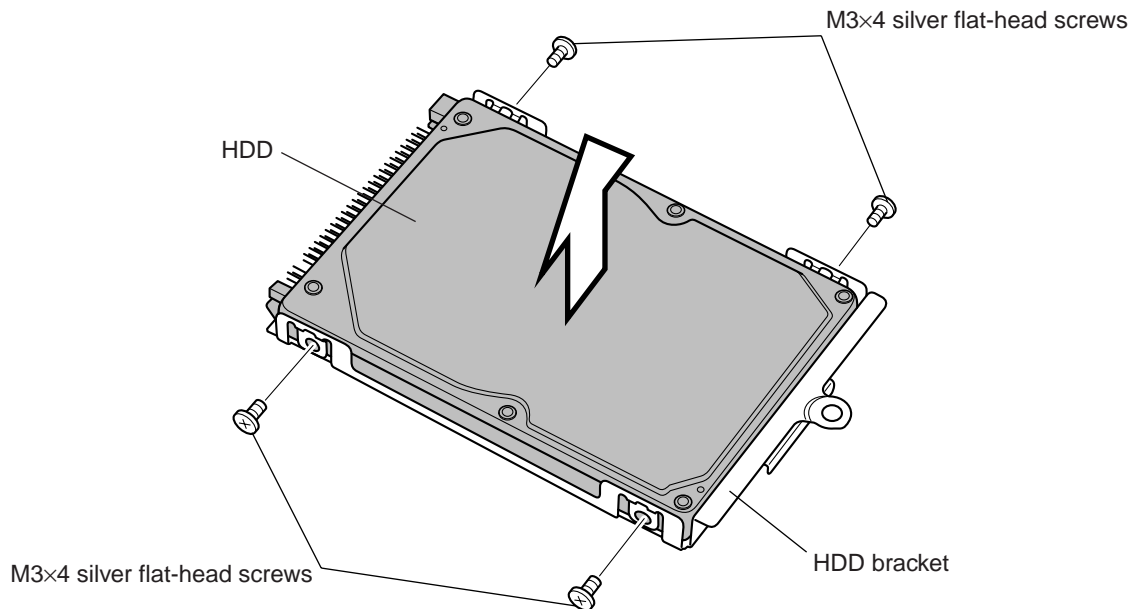


Figure 4-8 Removing screws and HDD bracket

CAUTION: Do not apply pressure to the top or bottom of the HDD.

Installing the HDD

To install the HDD, follow the steps below and refer to Figures 4-6 to 4-8.

CAUTION: Don't hold the HDD by its top and bottom flat surfaces. It may damage the HDD.

1. Seat the **HDD** in the **bracket**.
2. Secure the **bracket** with **four M3×4 silver flat-head screws**.

CAUTION: Do not apply pressure to the middle of the HDD pack. It may damage the HDD bracket. Hold the HDD by its corners.

3. Hold the **HDD pack** by its corners and insert it into the computer. Press to ensure a firm connection.
4. Seat the **HDD cover**.
5. Secure the **HDD cover** with **two M2.5×12 black flat-head screws**.

4.4 Slim Select Bay Module

Removing the Slim Select Bay Module

To remove the slim select bay module, follow the steps below and refer to Figures 4-9 and 4-10.

1. If a screw (**M3×4 black flat-head screw**) is set in the lock position, remove it.
2. Slide the **latch** toward the back of the computer to release it, and then pull the **module** out of the **slim select bay**.

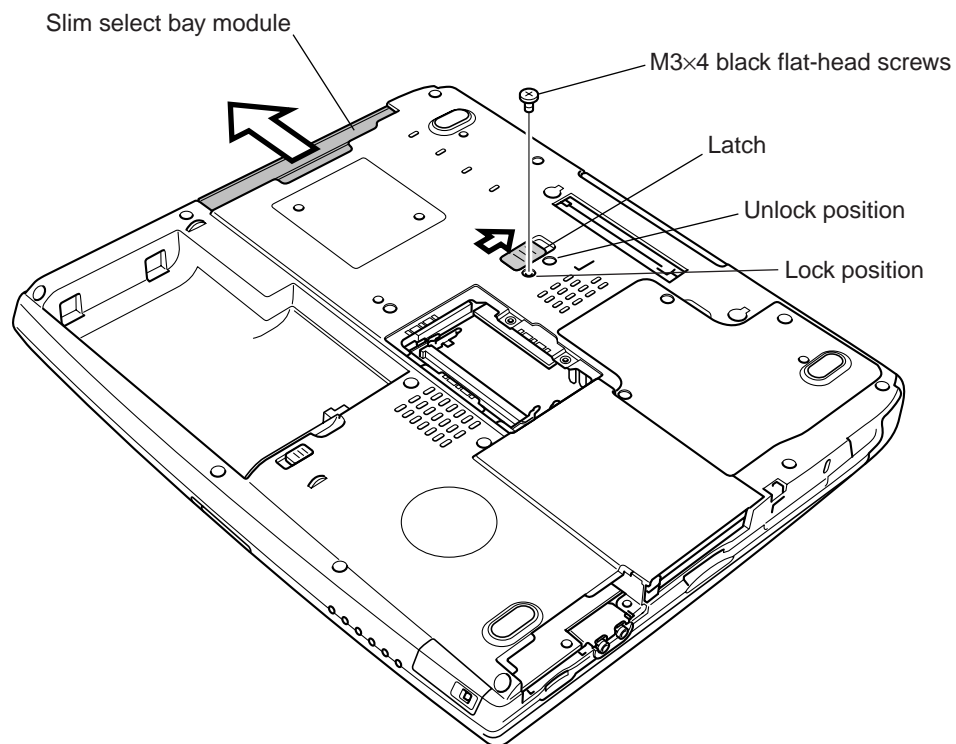


Figure 4-9 Removing the slim select bay module

NOTE: If you are going to replace an ODD, follow the steps below to disassemble the slim select bay module.

3. Remove **two M2×8 black screws** securing the **connector cover**.
4. Remove the **connector cover** and **ODD interface board**.
5. Remove **five M2×3 thin silver flat-head screws** securing the **ODD bracket**.
6. Remove the **ODD bracket**.

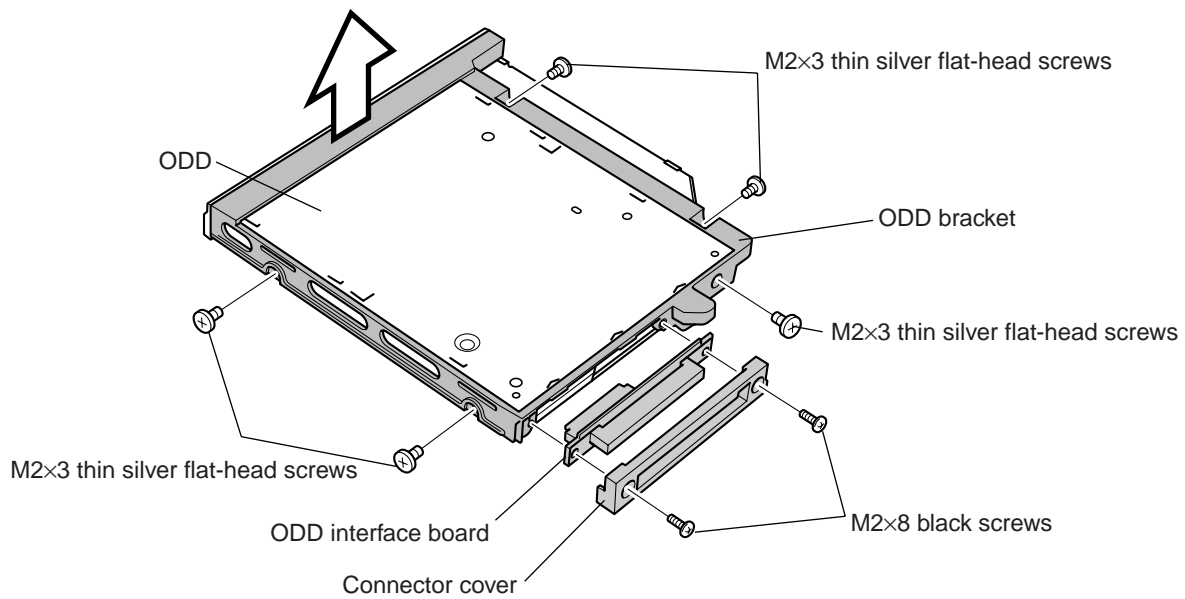


Figure 4-10 Disassembling the optical disk drive

Installing the Slim Select Bay Module

To install the slim select bay module, follow the steps below and refer to Figures 4-9 and 4-10.

1. Seat the **ODD** in the **ODD bracket**.
2. Secure the **ODD bracket** to the **ODD** with **five M2×3 thin silver flat-head screws**.
3. Connect the **ODD interface board** to the **ODD**.
4. Seat the **connector cover** and secure it to the **ODD** with **two M2×8 black screws**.
5. Insert the **module** into the **slim select bay** and press it gently until the **latch** clicks.
6. Set **one M3×4 black flat-head screw** in the lock position, if necessary.

4.5 Modem Daughter Card

Removing the Modem Daughter Card

To remove the modem daughter card (MDC), follow the steps below and refer to Figures 4-11 and 4-12.

1. Remove **one M2.5×6 black flat-head screw** and **two M2.5×4 black flat-head screws** securing the **CPU/MDC slot cover**.
2. Remove the **CPU/MDC slot cover**.

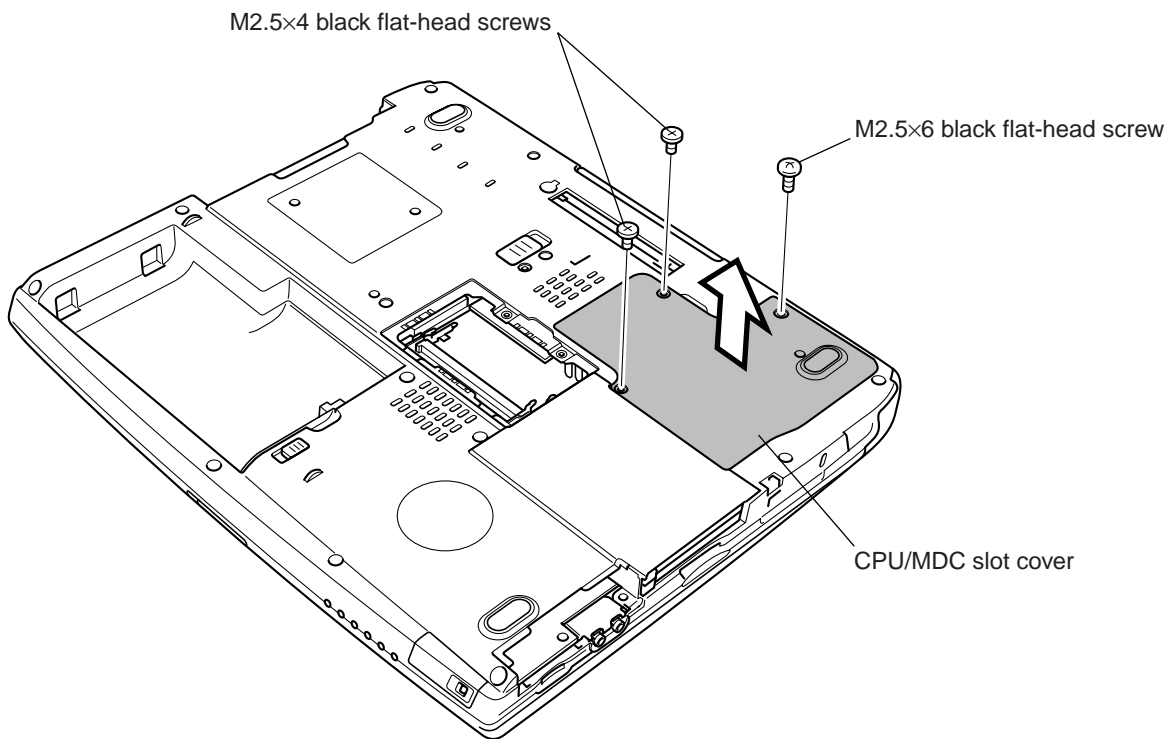


Figure 4-11 Removing the CPU/MDC slot cover

3. Remove **two M2×4 screws** securing the **MDC**.
4. Carefully lift up the **MDC** to disconnect it from **PJ2017** on the **system board**.
5. Carefully disconnect the **modem cable** from **JP1** on the **MDC**.

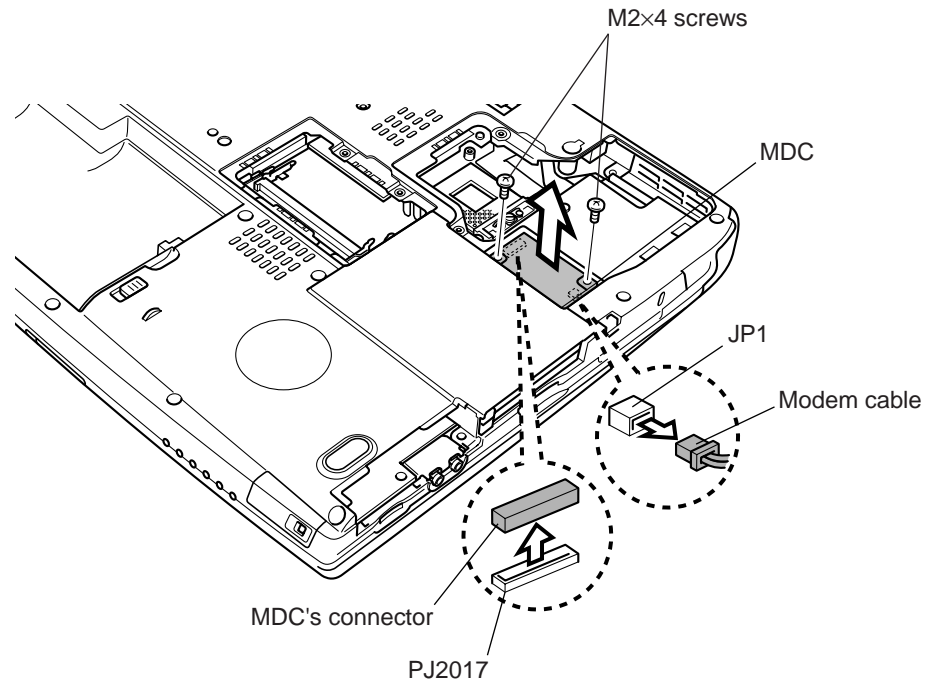


Figure 4-12 Removing the MDC

Installing the Modem Daughter Card

To install the modem daughter card (MDC), follow the steps below and refer to Figures 4-11 and 4-12.

1. Carefully connect the **modem cable** to **JP1** on the **MDC**.
2. Seat the **MDC** and press carefully on the right end of the card to connect it to **PJ2017** on the **system board**. Be careful not to damage the card or connector.
3. Secure the **MDC** with **two M2×4 screws**.
4. Seat the **CPU/MDC slot cover**.
5. Secure the cover with **one M2.5×6 black flat-head screw** and **two M2.5×4 black flat-head screws**.

4.6 CPU

Removing the CPU

To remove the CPU, follow the steps below and refer to Figures 4-13 and 4-16.

1. Remove **one M2.5×6 black flat-head screw** and **two M2.5×4 black flat-head screw** securing the **CPU/MDC slot cover**, if necessary.
2. Remove **two M2×4 black screws** securing the **metal brace** to remove it.

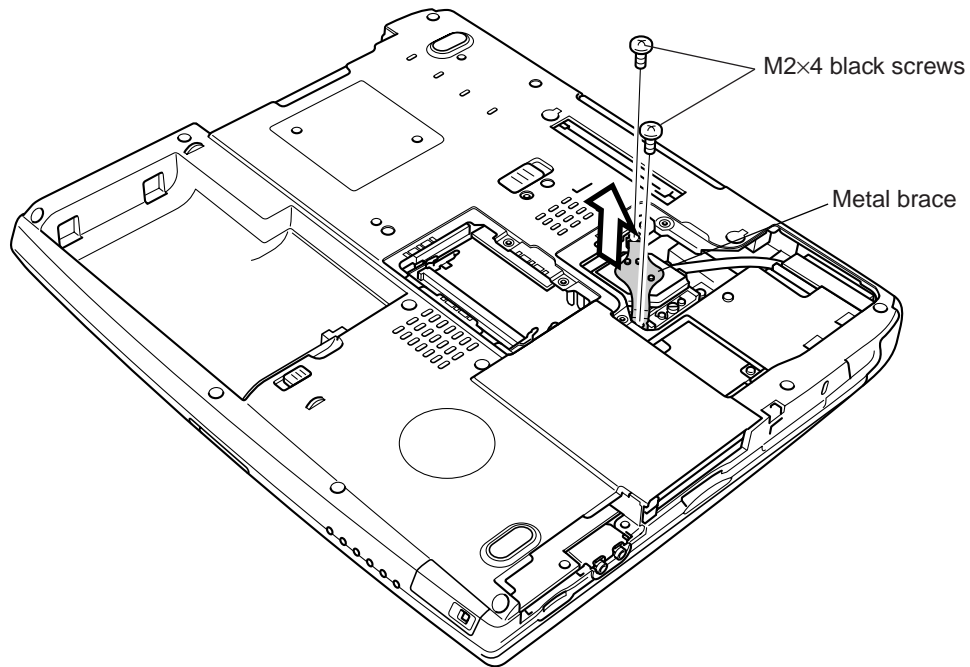


Figure 4-13 Removing the metal brace

3. Remove the **cooling module**.

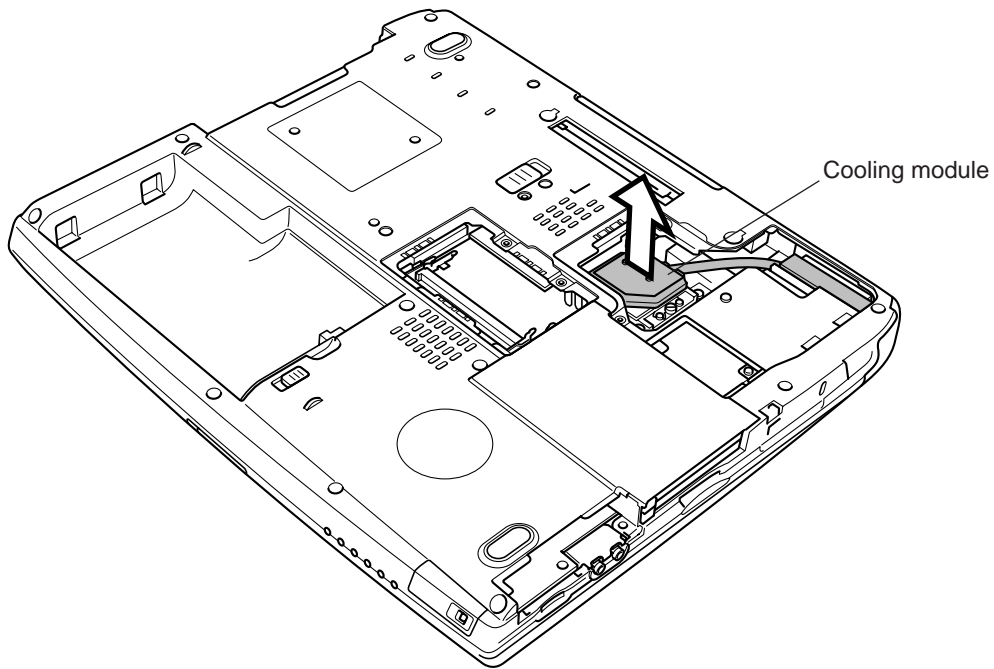


Figure 4-14 Removing the cooling module

4. Turn the **cam** to the unlock position with a flat-blade screwdriver to unlock the **CPU**.

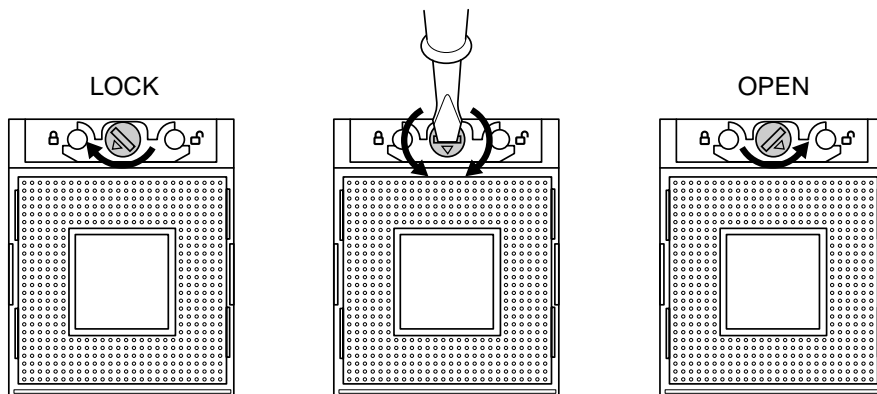


Figure 4-15 Unlocking the CPU

5. Lift up the **CPU**.

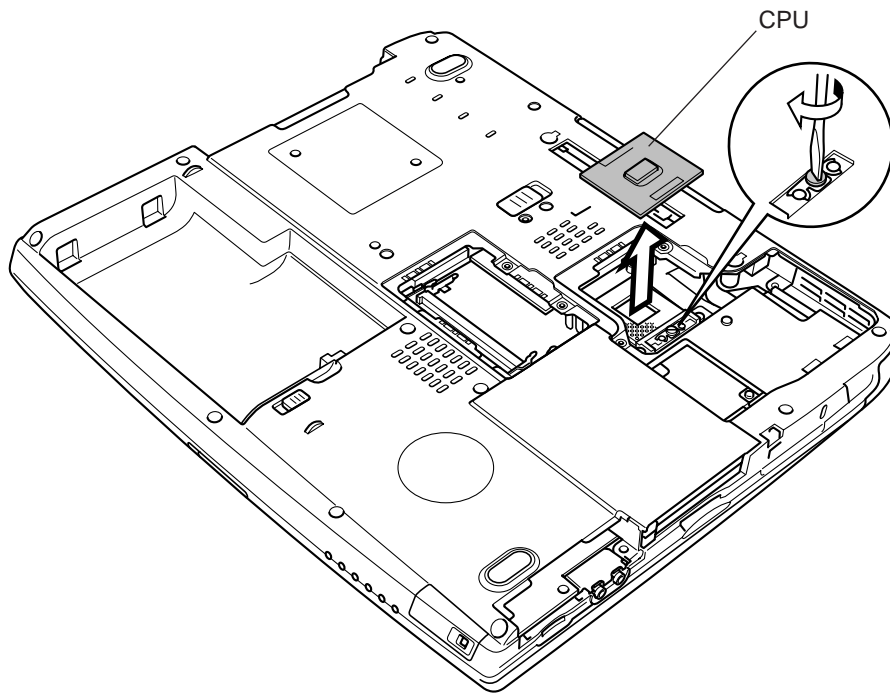


Figure 4-16 Removing the CPU

Installing the CPU

To install the CPU, follow the steps below and refer to Figures 4-13 to 4-17.

1. Make sure the **cam** is in the open position.
2. Seat the **CPU** in the **CPU socket**, aligning the triangle mark on the CPU with that on the socket. Make sure the alignment is exact to avoid damaging pins on the **CPU**.
3. Press the interposer gently with your fingers and turn the **cam** on the **CPU socket** to the lock position with a flat-blade screwdriver to secure the **CPU**.
4. Wipe away the remaining grease on the back of the cooling plate.
5. Apply new grease on the **CPU** as shown in Figure 4-17.

CAUTION: When you install the CPU, apply new grease on the top of the chip. Make sure the bottom of the heat pipe covers the top of the CPU.



Figure 4-17 Applying new grease

6. Seat the **cooling module** on the **CPU**.
7. Seat the **metal brace** and secure it with **two M2×4 screws**.
8. Seat the **CPU/MDC slot cover** and secure it with **one M2.5×6 black flat-head screw** and **two M2.5×4 black flat-head screws**, if necessary.

4.7 Keyboard

Removing the Keyboard

To remove the keyboard, follow the steps below and refer to Figures 4-18 to 4-21.

1. Open the display panel.
2. Insert your fingernails into **notches** in the **keyboard brace** and the computer, and pry up to unlatch the brace at twelve points and remove it.

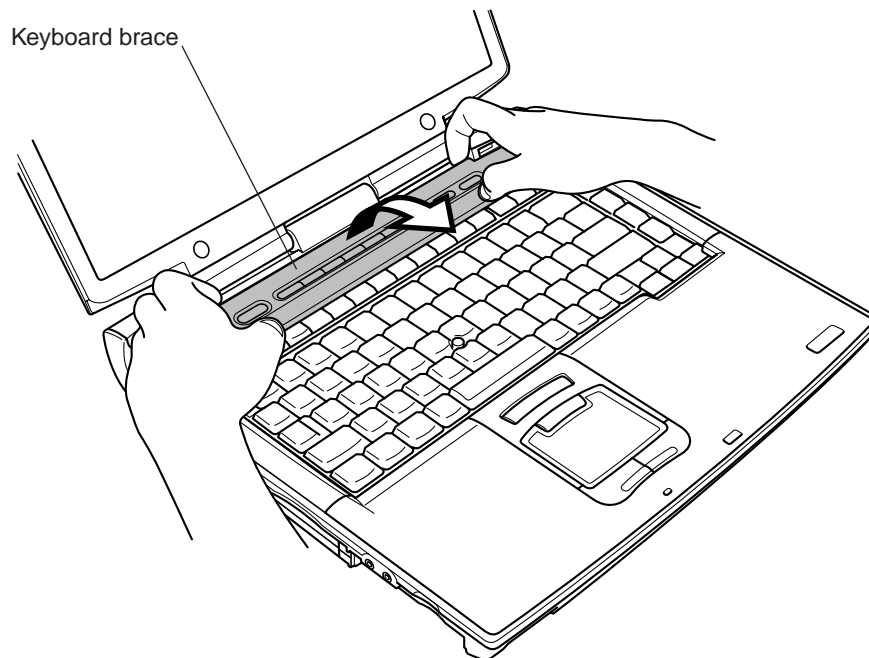


Figure 4-18 Removing the keyboard brace

3. Remove **two M2.5×2.6 black flat-head screws** securing the keyboard.
4. Rotate out the **keyboard** and lay it on top of the palm rest.

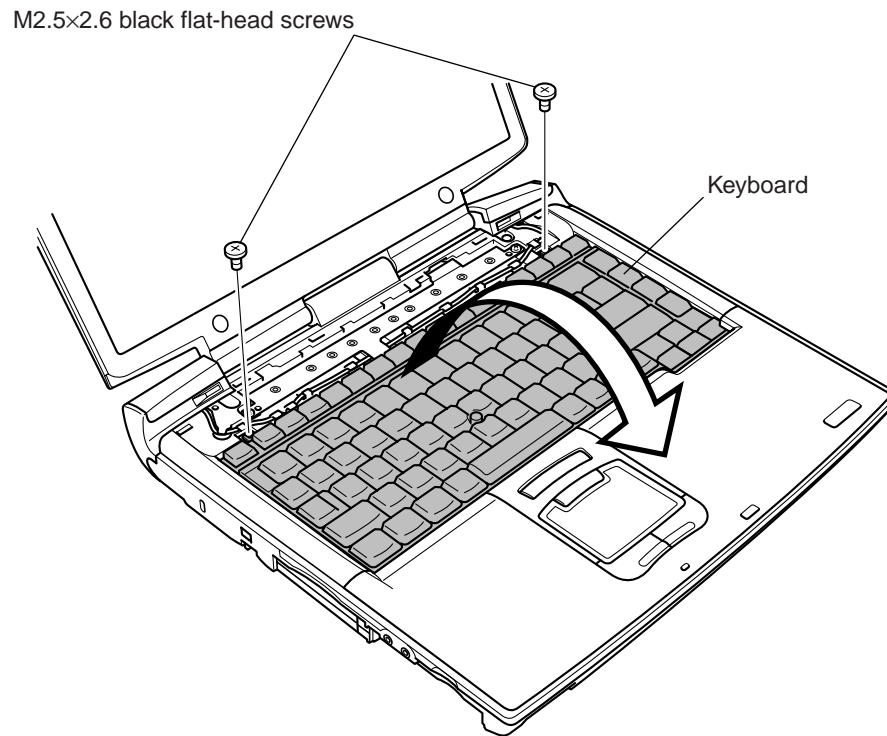


Figure 4-19 Removing screws securing the keyboard

5. Remove **one M2.5×16 black screw** securing the **metal plate** to remove it.

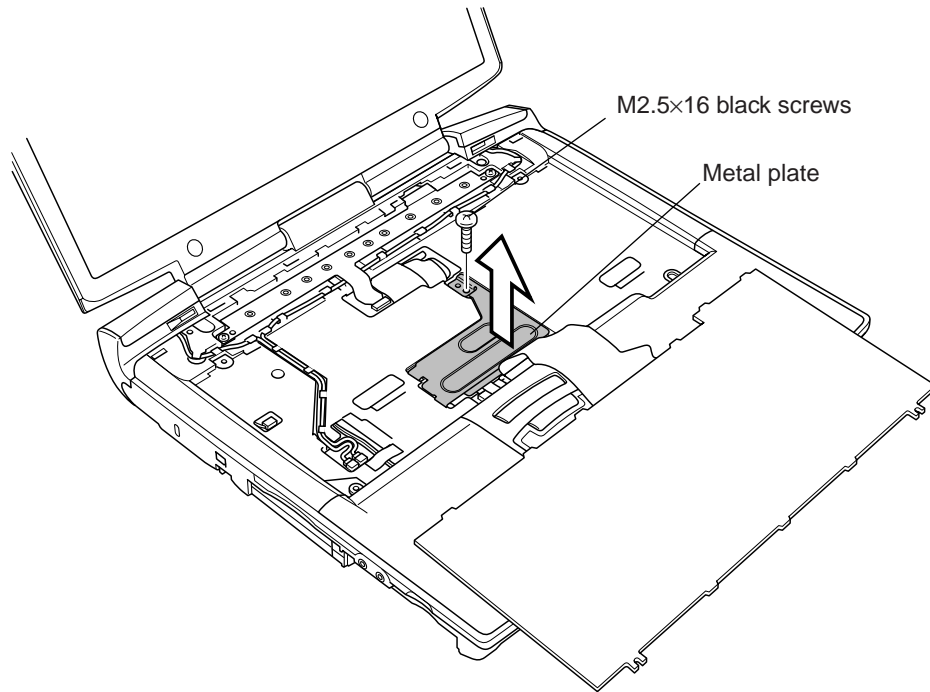


Figure 4-20 Removing the metal plate

6. Disconnect the **keyboard cable** from **PJ123** on the **system board**, and remove the **keyboard**.

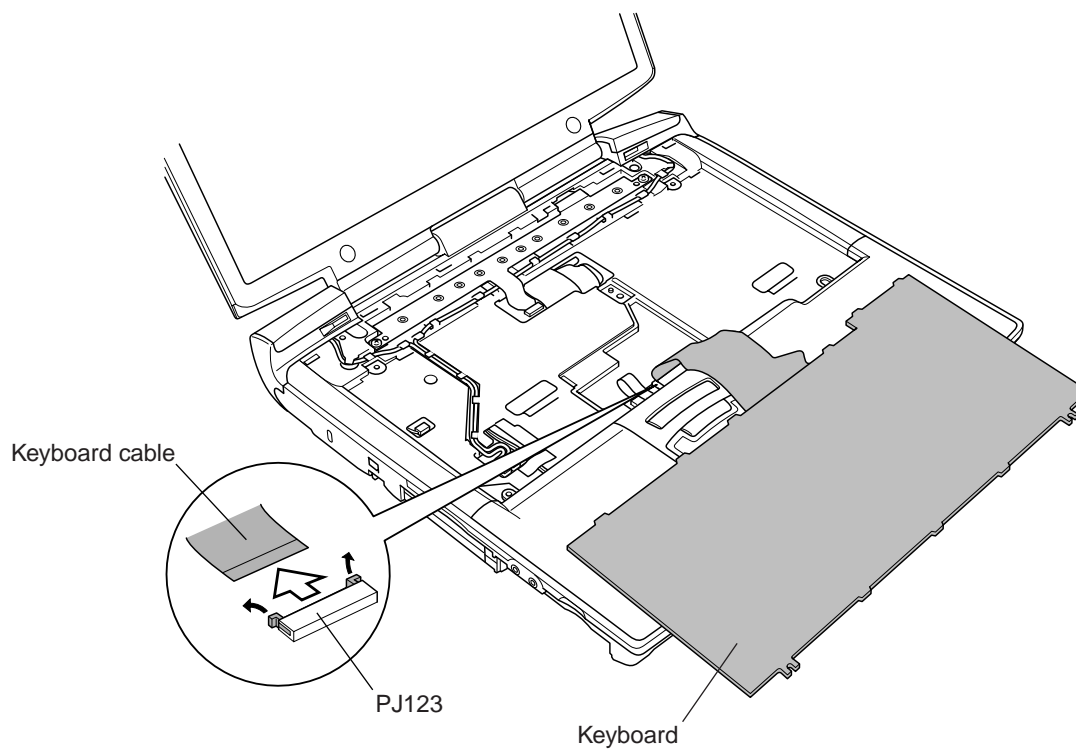


Figure 4-21 Removing the keyboard

Installing the Keyboard

To install the keyboard, follow the steps below and refer to Figures 4-18 to 4-21.

1. Lay the **keyboard** on the palm rest upside down.
2. Connect the **keyboard cable** to **PJ123** on the **system board**.
3. Seat the metal plate and secure it with **one M2.5×16 black screw**.
4. Turn the **keyboard** right side up and seat it.
5. Secure the **keyboard** with **two M2.5×3 black flat-head screws**.
6. Seat the **keyboard brace** and press to secure **twelve latches**.

4.8 Switch Board

Removing the Switch Board

To remove the switch board, make sure the computer is in boot mode and powered off, follow the steps below and refer to Figure 4-22.

1. Disconnect the **switch board cable** from **PJ2025** on the system board.
2. Remove **two M2.5×3 black flat-head screws**.
3. Remove the **switch board**.

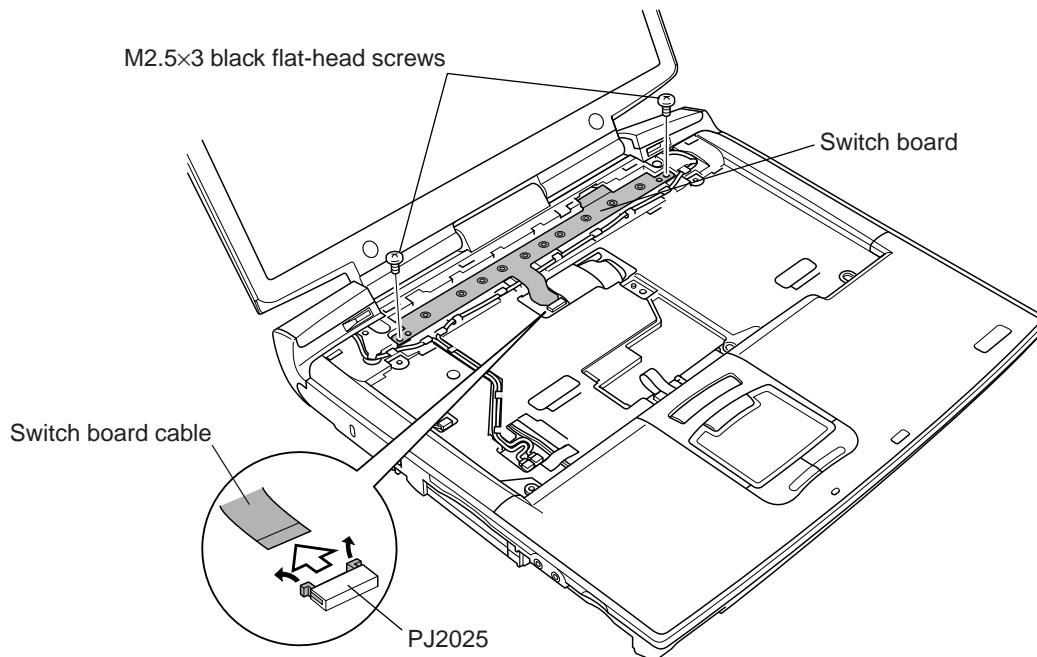


Figure 4-22 Removing the switch board

Installing the Switch Board

To install the switch board, make sure that the computer is in boot mode and powered off, follow the steps below and refer to Figure 4-22.

1. Seat the **switch board**.
2. Secure the **switch board** with **two M2.5×3 black flat-head screws**.
3. Connect the **switch board cable** to **PJ2025** on the **system board**. Route the **switch board cable** under the speaker cables.

4.9 Speakers

Removing the Speakers

To remove the speakers, follow the steps below and refer to Figures 4-23 and 4-24.

1. Turn the computer upside down.
2. Remove **two M2.5×16 black screws**.

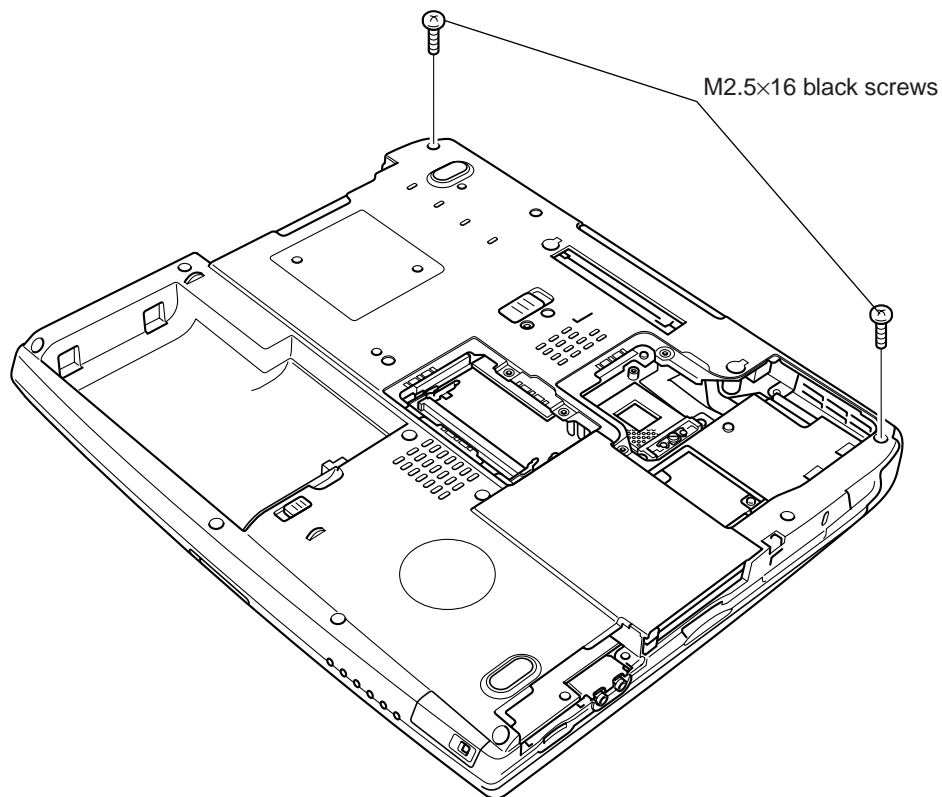


Figure 4-23 Removing the screws securing the speakers

3. Remove **one M2.5×4 black flat-head screw** securing each **speaker**.
4. Disconnect **two speaker cables** from **PJ5004** and **PJ5005** on the **system board**.
5. Free **two speaker cables** from their hooks.
6. Remove **one M2.5×4 black flat-head screw** from each of **the speaker**.
7. Remove **the speakers**.

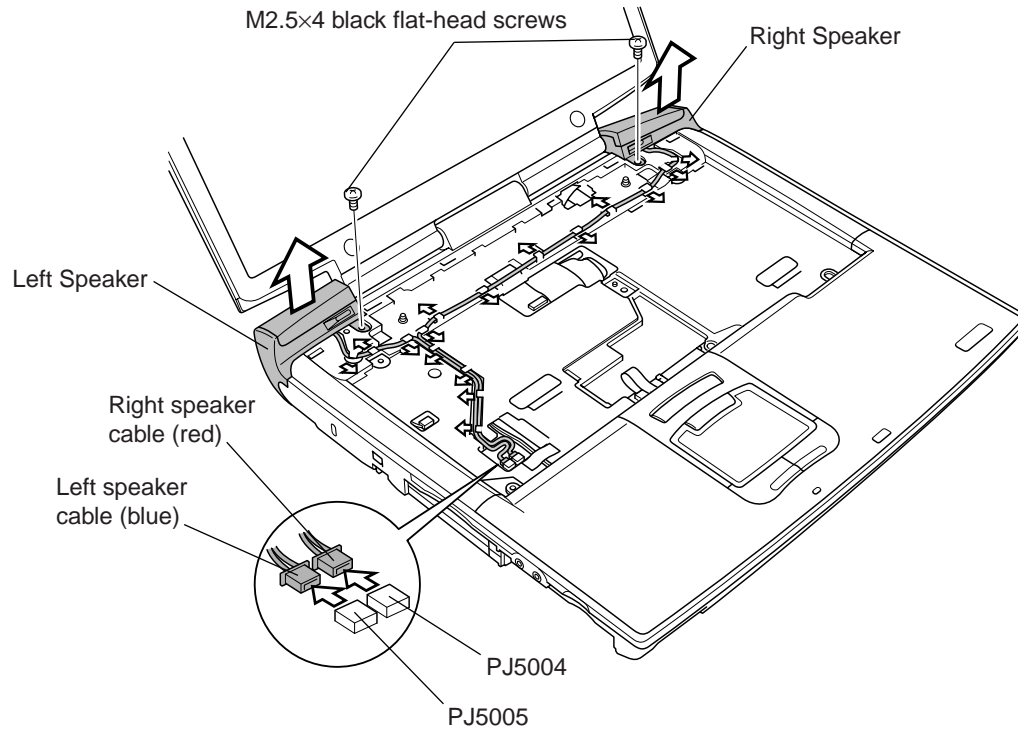


Figure 4-24 Removing the speakers

Installing the Speakers

To install the speakers, follow the steps below and refer to Figures 4-23 and 4-24.

1. Seat each of the **speaker** and secure it from one latch.
2. Secure each of the speaker with **one M2.5×4 black flat-head screw**.
3. Route **two speaker cables** through their hooks.
4. Connect the **right speaker cable (red)** to **PJ5004** on the system board.
5. Connect the **left speaker cable (blue)** to **PJ5005** on the system board.
6. Close the display panel and turn the computer upside down.
7. Secure each of the speaker with **one M2.5×16 black screw**.

4.10 Palm Rest

Removing the Palm Rest

To remove the palm rest, follow the steps below and refer to Figures 4-25 and 4-26.

1. Turn the computer upside down.
2. Remove **seven M2.5×12 black screws**.

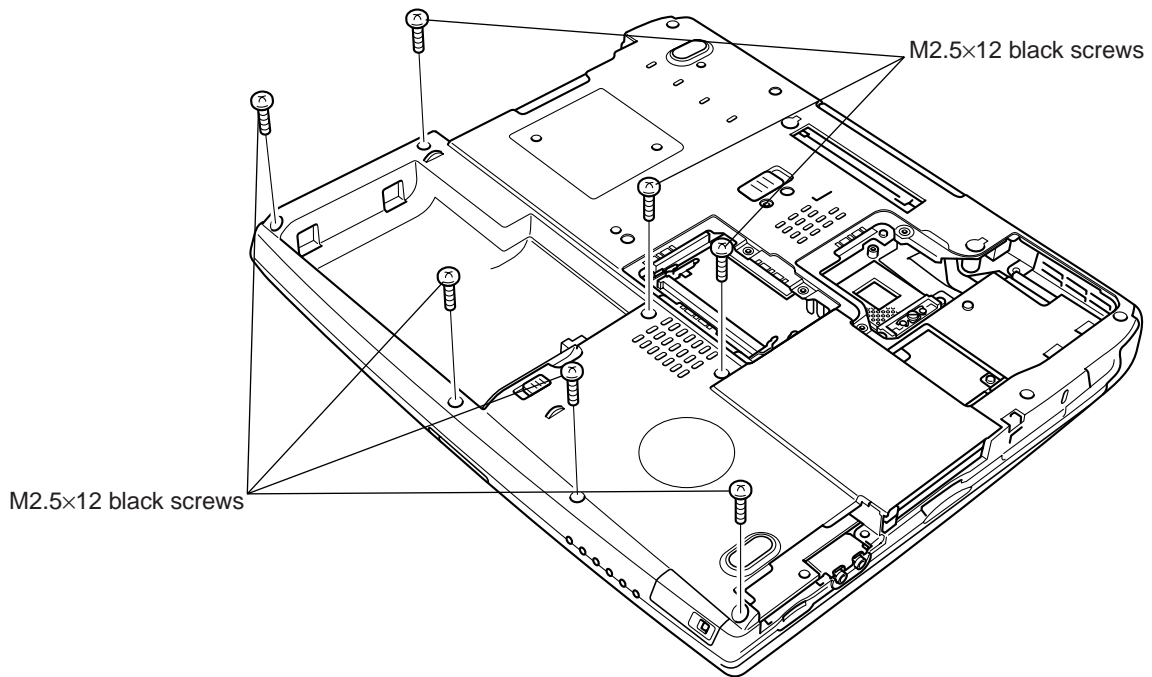


Figure 4-25 Removing the screws from the bottom of the computer

3. Turn the computer right side up and open the display panel.
4. Disconnect the **pad cable** from **PJ2003** on the **system board**.
5. Remove **two M2.5×5 black flat-head screws** securing the **palm rest**.
6. Release **two latches** to remove the **palm rest**.

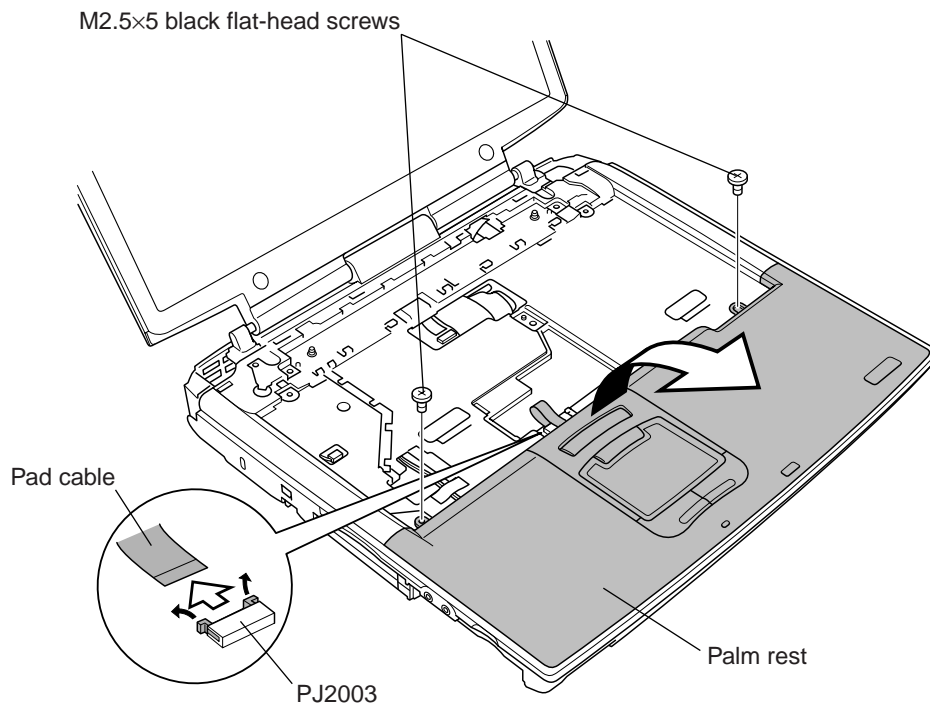


Figure 4-26 Removing the palm rest

Installing the Palm Rest

To install the palm rest, follow the steps below and refer to Figures 4-25 and 4-26.

1. Insert four tabs of the **palm rest** into the slits on the **top cover** to seat the **palm rest**. Secure the **palm rest** with **two latches**.
2. Secure the **palm rest** with **two M2.5×5 black flat-head screws**
3. Connect the **pad cable** to **PJ2003** on the **system board**.
4. Close the display panel and turn the computer upside down.
5. Secure **seven M2.5×12 black screws**.

4.11 Touch Pad

Removing the Touch Pad

To remove the touch pad, follow the steps below and refer to Figures 4-27 and 4-28.

1. Remove **two M2.5×5 black flat-head screws** and **two M2.5×4 screws** from the back of the **palm rest**.

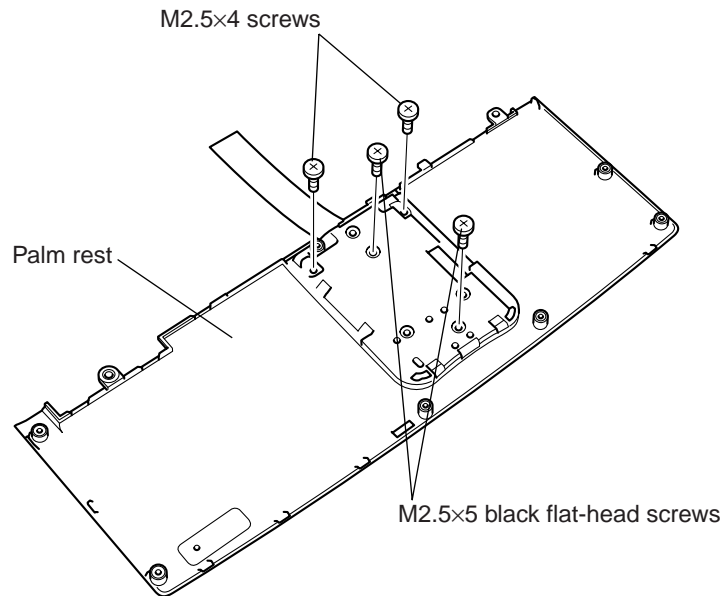


Figure 4-27 Removing the screws

2. Hold the **palm rest** with both hands and then slightly bend it to release **two latches** securing each sides of the **touch pad cover**. Be careful not to bend the **palm rest** excessively, or it will be broken.
3. Remove the **touch pad cover** and **touch pad**.
4. Disconnect the **pad cable** from the **connector** on the **touch pad**.

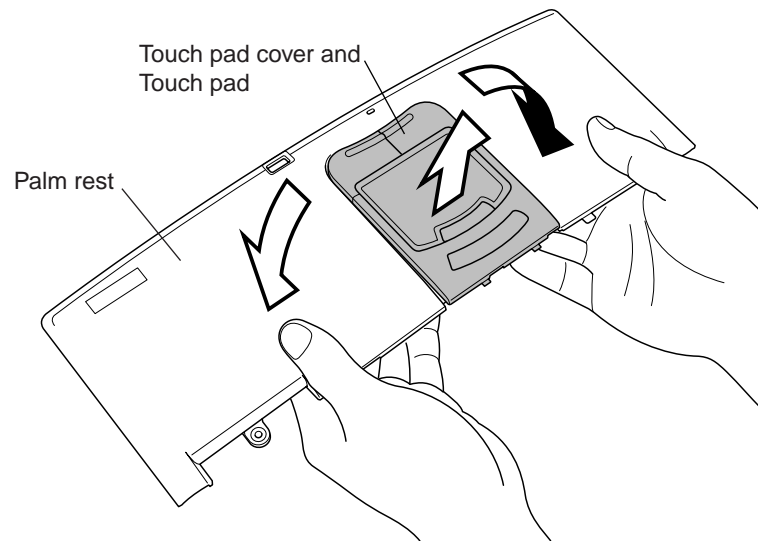


Figure 4-28 Removing the touch pad

Installing the Touch Pad

To install the touch pad, follow the steps below and refer to Figures 4-27 and 4-28.

1. Connect the **pad cable** to the **connector** on the **touch pad**.
2. Assemble the **touch pad cover** and **touch pad**, and then seat them to secure them with **four latches**.
3. Secure the **touch pad** with **two M2.5×5 black flat-head screws** and **two M2.5×4 screws**.

4.12 Internal Microphone

Removing the Internal Microphone

To remove the internal microphone, follow the steps below and refer to Figure 4-29.

1. Remove **one strip of tape** securing the **internal microphone cable**.
2. Disconnect the **internal microphone cable** from **PJ5002** on the **sound board**.
3. Remove the **internal microphone**.

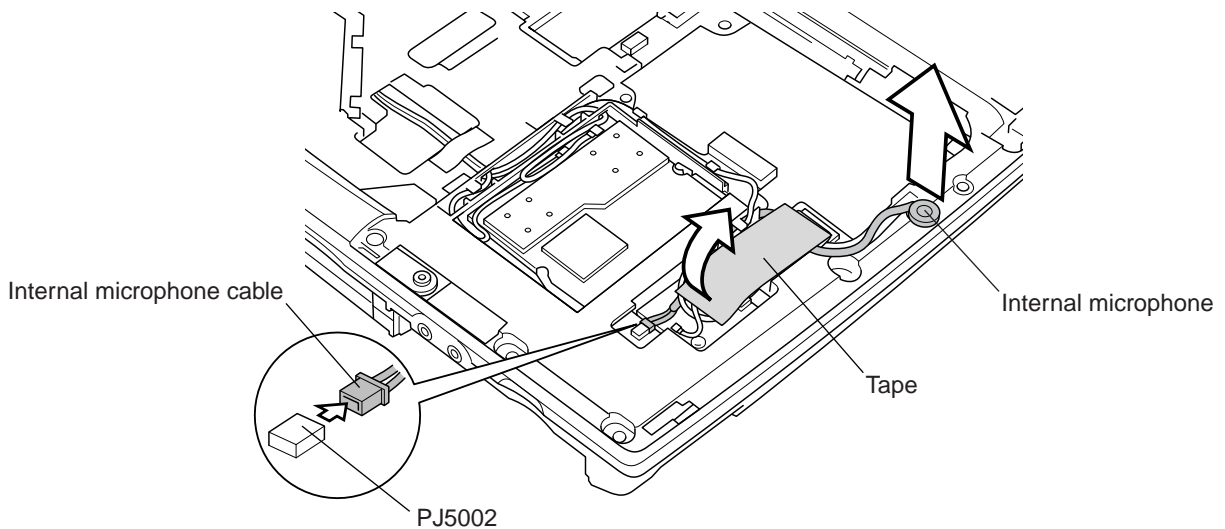


Figure 4-29 Removing the internal microphone

Installing the Internal Microphone

To install the internal microphone, follow the steps below and refer to Figure 4-29.

1. Seat the **internal microphone**.
2. Connect the **internal microphone cable** to **PJ5002** on the **sound board**.
3. Secure the **internal microphone cable** with **one strip of tape**.

4.13 Bluetooth Module

Removing the Bluetooth Module

To remove the Bluetooth module, follow the steps below and refer to Figure 4-30.

NOTE: The Bluetooth module is an option in some models.

1. Disconnect the **Bluetooth antenna coaxial cable** (brown) from module's **connector** using an **antenna coaxial cable disconnecter**.
2. Turn up the **insulator**.
3. Disconnect the **Bluetooth module cable** from **PJ4900** on the **system board**.
4. Remove **two M2×4 screws** securing the **Bluetooth module**.
5. Remove the **Bluetooth module**.
6. Disconnect the **Bluetooth module cable** from the connector on the **module**.

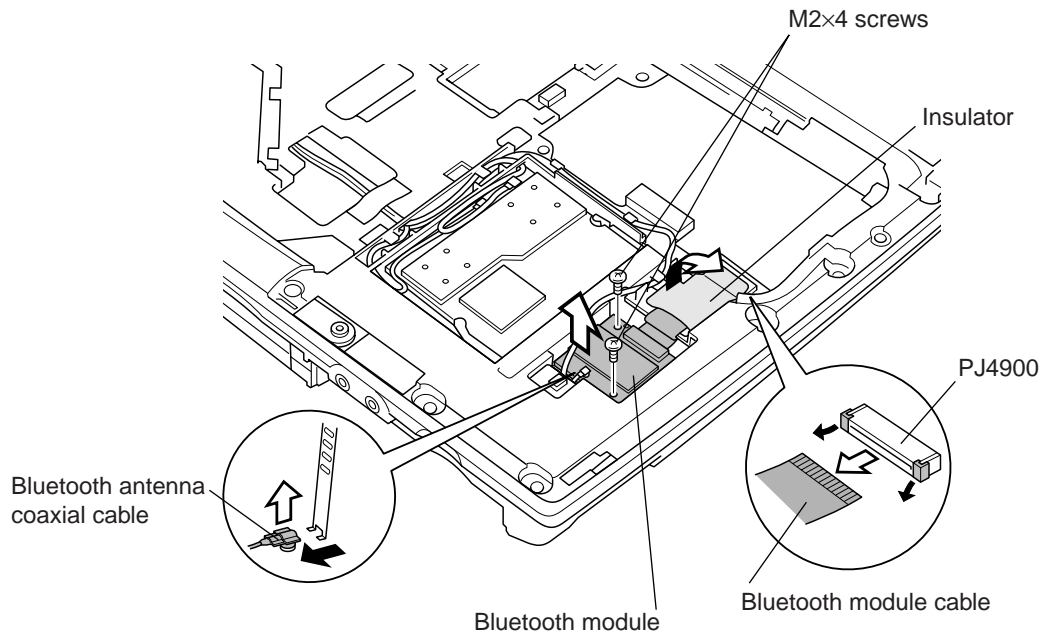


Figure 4-30 Removing the Bluetooth module

Installing the Bluetooth Module

To install the Bluetooth module, make sure that the computer is in boot mode and powered off, follow the steps below and refer to Figure 4-30.

NOTE: *The Bluetooth module is an option in some models.*

1. Connect the **Bluetooth module cable** to the **connector** on the **Bluetooth module**.
2. Seat the **Bluetooth module** and secure it with **two M2×4 screws**.
3. Connect the **Bluetooth module cable** to **PJ4900** on the **system board**.
4. Secure the **Bluetooth module cable** with the **insulator**.
5. Connect the **Bluetooth antenna coaxial cable** (brown) to the **connector** on the **Bluetooth module**.

4.14 Wireless LAN Mini PCI Card

Removing the Wireless LAN Mini PCI Card

To remove the wireless LAN Mini PCI card, make sure the computer is in boot mode and powered off, follow the steps below and refer to Figure 4-31.

1. Remove one strip of tape securing the **antenna coaxial cables**.
2. Disconnect **two antenna coaxial cables** from the **wireless LAN Mini PCI card** using an antenna coaxial cable disconnecter.
3. Gently press out on the **latches**. One end of the **wireless LAN Mini PCI card** will pop up.
4. Grasp the **wireless LAN Mini PCI card** and pull it out.

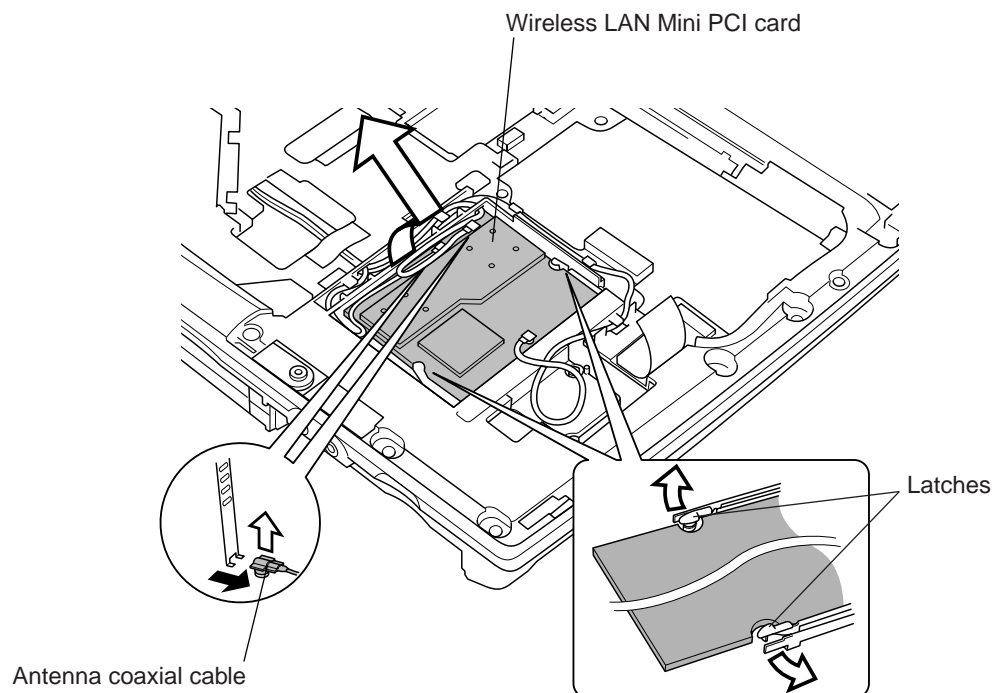


Figure 4-31 Removing the wireless LAN card

CAUTION: Do not touch the connectors on the wireless LAN Mini PCI card or on the computer. Debris on the connectors may cause the card to malfunction or to get damaged.

Installing the Wireless LAN Mini PCI Card

To install the wireless LAN Mini PCI card, follow the steps below and refer to Figure 4-31.

1. Fit the **wireless LAN Mini PCI card**'s connector into the computer's connectors and press it carefully to ensure firm contact.

CAUTION: Do not touch the connectors on the wireless LAN Mini PCI card or on the computer. Debris on the connectors may cause the card to malfunction or to get damaged.

2. Gently, push the wireless LAN Mini PCI card down until **latches** on either side engage the card to hold it in place.
3. Connect **two antenna coaxial cables** with the appropriate color to the proper connectors on the **wireless LAN Mini PCI card**.
4. Secure the **antenna coaxial cable** with one strip of tape.

4.15 Top Cover with Display Assembly

Removing the Top Cover with Display Assembly

To remove the top cover with display assembly, follow the steps below and refer to Figures 4-32 to 4-35.

1. Turn the computer upside down.
2. Remove **one M2.5×6 black flat-head screw** and **two M2.5×4 black flat-head screw** securing the **CPU/MDC slot cover** to remove it, if necessary.
3. Remove the following **five screws**:
 - Two M2.5×16 black flat-head screws
 - Three M2.5×6 black flat-head screws

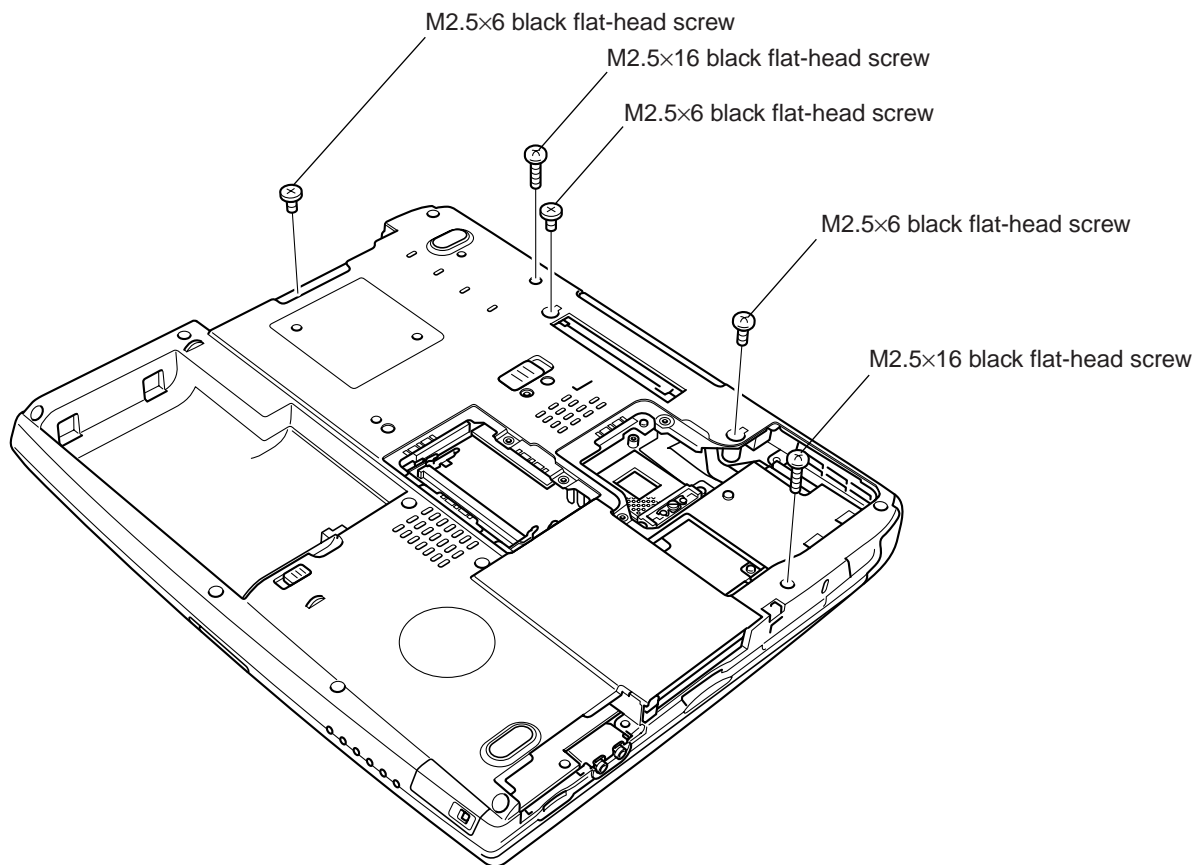


Figure 4-32 Removing the screws from the bottom of the computer

4. Turn the computer right side up and open the display panel.
5. Disconnect following **two cables**:
 - LCD/FL cable from PJ4205 on the VGA board
 - Internal microphone cable from PJ5002 on the sound board (if necessary)

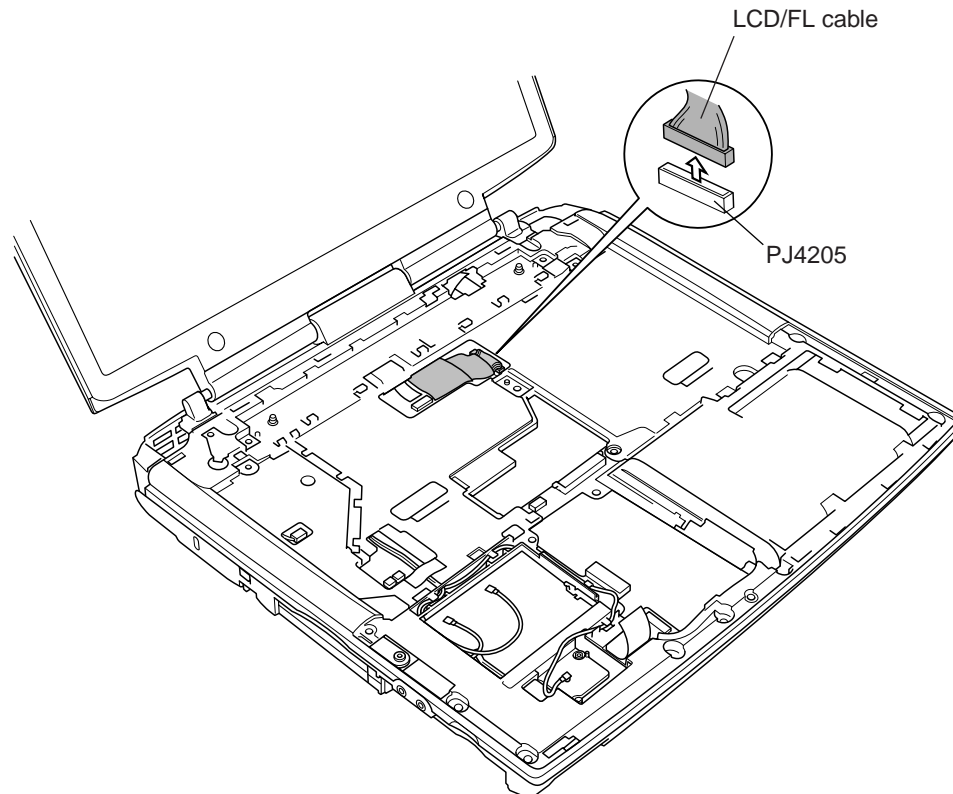


Figure 4-33 Disconnecting the cable

6. Remove following **screws** from the top cover:
 - Three M2.5×5 black screws
 - One M2.5×4 brass flat-head screw
 - One M2.5×12 black flat-head screw

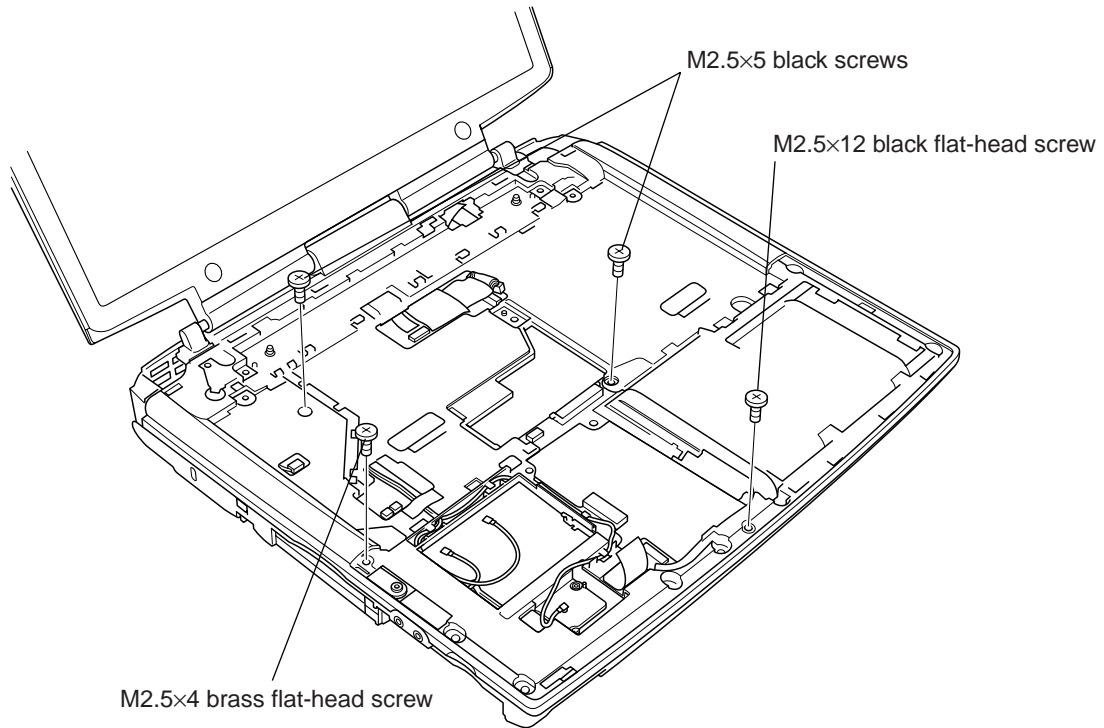


Figure 4-34 Removing the screws from the top cover

7. Lift up the **display assembly** to release **six latches** securing the **top cover** with the bottom case, and then remove the **top cover** and **display assembly**.

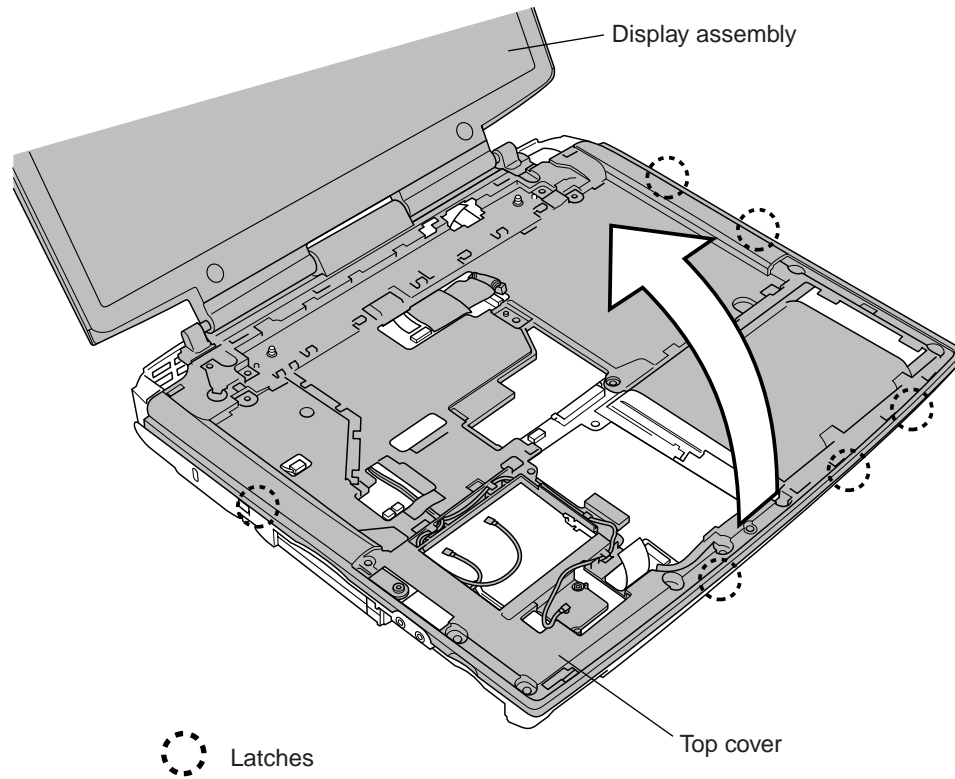


Figure 4-35 Removing the top cover with display assembly

Installing the Top Cover with Display Assembly

To install the top cover with display assembly, follow the steps below and refer to Figures 4-32 to 4-35.

1. Seat the **top cover with display assembly** and secure it with **six latches**.
2. Secure the **top cover** with following **screws**:
 - Three M2.5×5 black screws
 - One M2.5×4 brass flat-head screw
 - One M2.5×12 black flat-head screw
3. Connect following **four cables**:
 - LCD/FL cable to PJ4205 on the VGA board
 - Internal microphone cable to PJ5002 on the sound board (if necessary)
4. Close the display panel and turn the computer right side up.
5. Secure the bottom case with the following **five screws**:
 - Two M2.5×16 black flat-head screws
 - Three M2.5×6 black flat-head screws
6. Seat the **CPU/MDC cover** and secure it with **one M2.5×6 black flat-head screw** and **two M2.5×4 black flat-head screws**, if necessary.

4.16 Sound Board

Removing the Sound Board

To remove the sound board, follow the steps below and refer to Figure 4-36.

1. Remove **two M2.5×4 screws** securing the **sound board**.
2. Gently lift up the **sound board** to disconnect it from **PJ5006** on the **system board**.

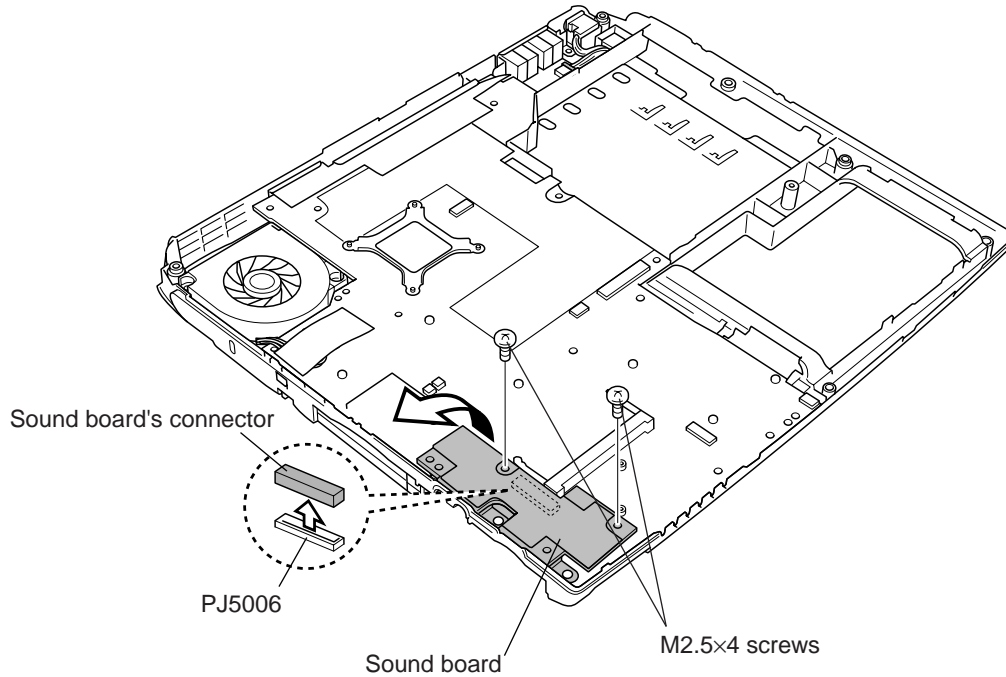


Figure 4-36 Removing the sound board

Installing the Sound Board

To install the sound board, follow the steps below and refer to Figure 4-36.

1. Seat the **sound board** to connect it to **PJ5006** on the **system board**.
2. Secure the **sound board** with **two M2.5×4 screws**.

4.17 Cooling Fan

Removing the Cooling Fan

To remove the cooling fan, follow the steps below and refer to Figures 4-37.

CAUTION: *The cooling fan can become very hot during operation. Wait for the fan to cool before removing it. Do not touch the fan rotor or fan blades or apply impact to the cooling fan module.*

1. Remove **one strip of tape** securing the **cooling fan cable**.
2. Remove the **cooling fan cable** from **PJ8770** on the **system board**.
3. Remove **two M2.5×6 black flat-head screws** securing the **cooling fan**.
4. Remove the **cooling fan**.

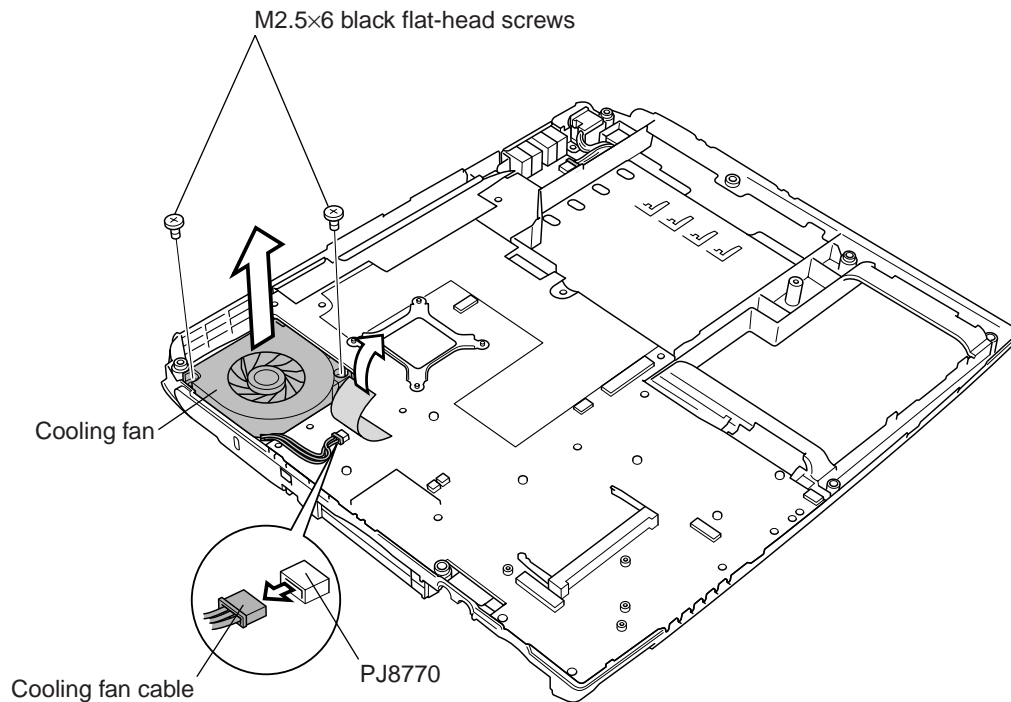


Figure 4-37 Removing the cooling fan

Installing the Cooling Fan

To install the cooling fan, follow the steps below and refer to Figures 4-37.

CAUTION: *When you remove the cooling fan, wipe the grease off of the bottom of the heat sink and top of the CPU. Apply new grease.*

1. Seat the **cooling fan** and secure it with **two M2.5×6 black flat-head screws**.
2. Connect the **cooling fan cable** to **PJ8770** on the **system board**.
3. Secure the **cooling fan cable** with **one strip of tape**.

4.18 RTC Battery

WARNING: When it is necessary to replace the RTC battery, be sure to use genuine batteries or replacement batteries authorized by TOSHIBA. Installing the wrong battery could cause a battery explosion or other damage.

If the RTC battery is found abnormal, it must not be installed. Replace it with a new battery, and dispose of the old one according to the local regulations.

Check for any of the following signs of damage:

- 1) *Electrolyte leakage*
 - *Corrosion (greenish color) on the battery connector or cable*
 - *Corrosion on the computer's battery connector*
 - *White powder on any part of the battery*
 - *White powder in the battery tray*
 - *Clear liquid on the battery*
 - *Clear liquid in the battery tray*
 - *Clear liquid on any board near the battery*
- 2) *Damage to the connection cable*
- 3) *Damage to the connector housing*

If any powder or liquid is found in or around the battery tray, clean it. Be very careful not to let any leaked material contact your eyes or mouth. Do not inhale fumes from leaked material.

If leaked material contacts your skin, eyes or mouth, wash the affected area thoroughly with clean water.

Removing the RTC Battery

To remove the RTC battery, follow the steps below and refer to Figure 4-38.

1. Remove **two strips of tape** securing the **RTC battery cable**.
2. Disconnect the **RTC battery cable** from **PJ9999** on the **system board**.
3. Remove **one strip of tape** securing the **RTC battery**.
4. Lift out the **RTC battery**.

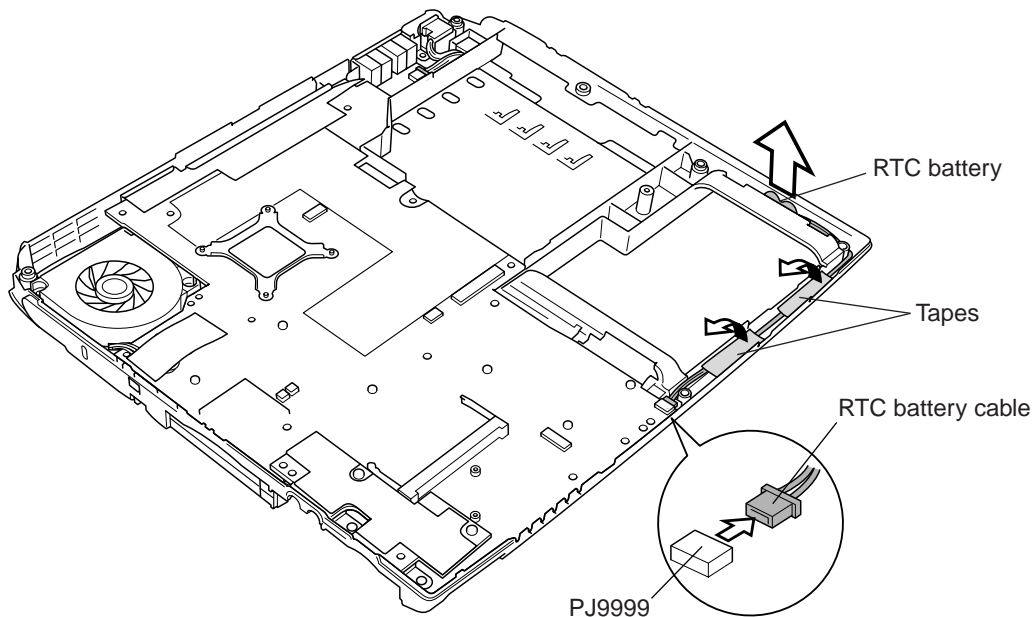


Figure 4-38 Removing the RTC battery

Installing the RTC Battery

To install the RTC battery, follow the steps below and refer to Figure 4-38.

1. Seat the **RTC battery**.
2. Secure the **RTC battery** with **one strip of tape**.
3. Connect the **RTC battery cable** to **PJ9999** on the **system board**.
4. Secure the **RTC battery cable** with **two strips of tape**.

4.19 System Board

Removing the System Board

To remove the system board, follow the steps below and refer to Figures 4-39 to 4-41.

1. Lift the **AC adaptor jack** out of its slot.

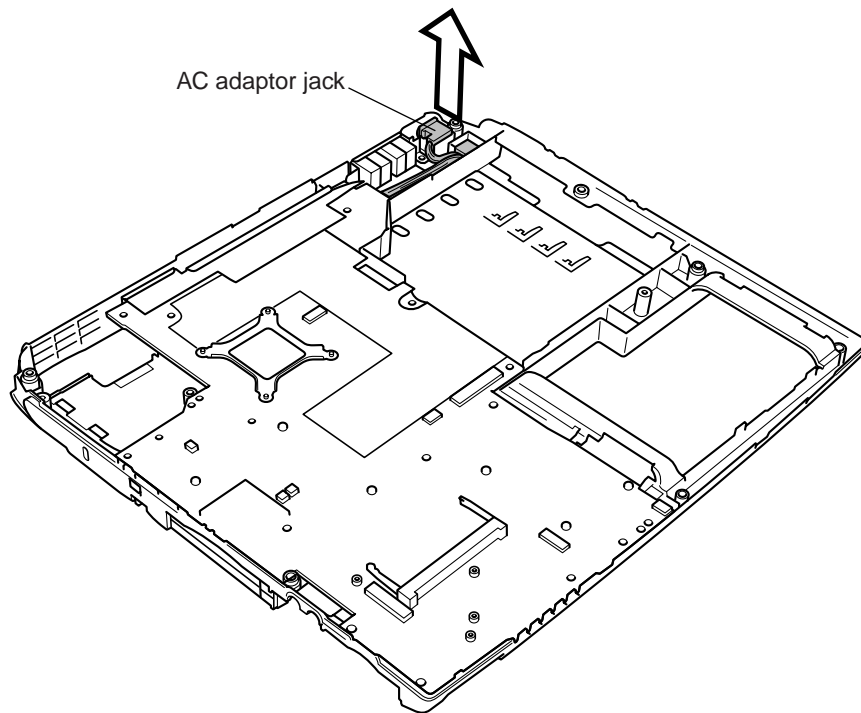


Figure 4-39 Dismounting the AC adaptor jack

2. Rotate the **system board** from the right side to lift it out of the **bottom case**. Be careful not to catch the **bottom case** on the **eject buttons** of the PC Card Slot.
3. Disconnect the **AC adaptor jack** from **PJ8800** on the **system board**.

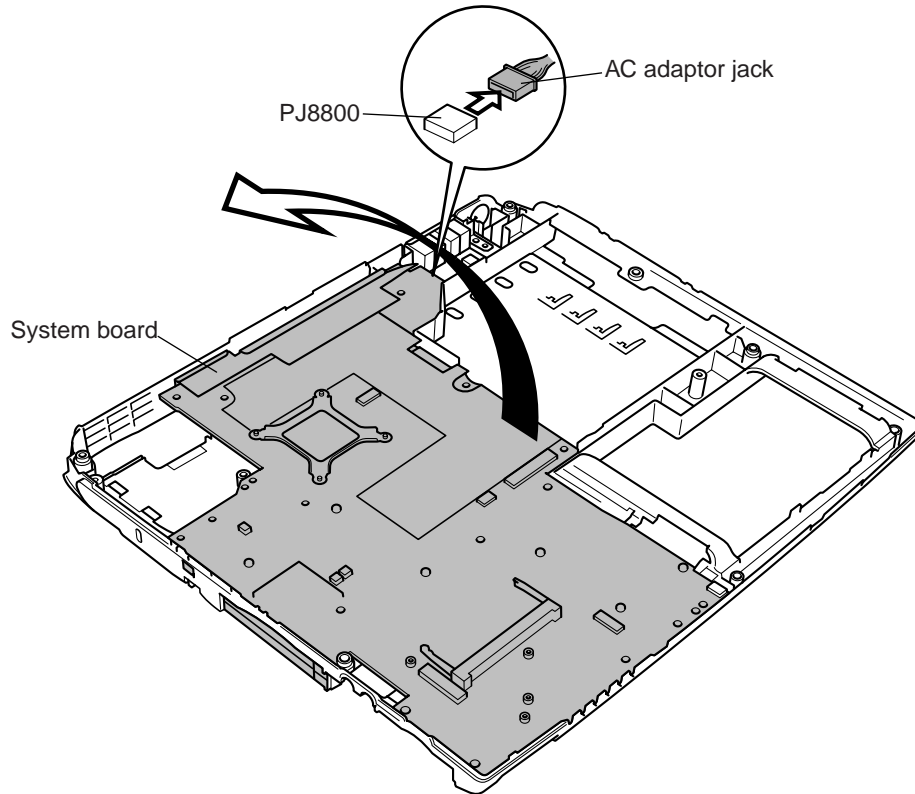


Figure 4-40 Removing the system board

4. Remove **two strips of tape** securing the **modem cable**.
5. Disconnect the **modem cable** from **PJ2018** on the **system board**.

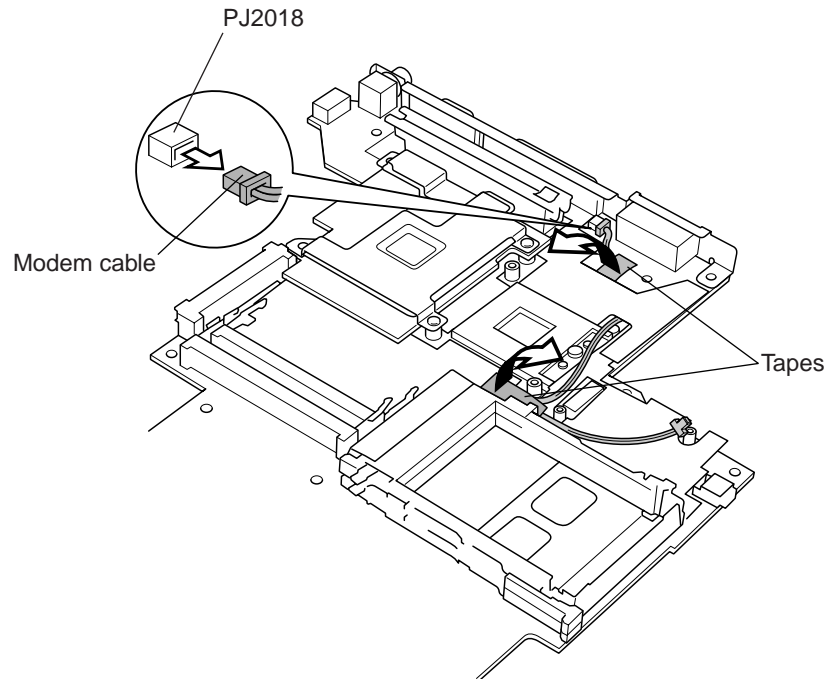


Figure 4-41 Removing the modem cable

Installing the System Board

To install the system board, follow the steps below and refer to Figures 4-39 to 4-41.

1. Connect the **modem cable** to **PJ2018** on the **system board**.
2. Secure the **modem cable** with **two strips of tape**.
3. Connect **AC adaptor jack** to **PJ8800** on the **system board**.
4. Seat the **system board**. Be sure to align the sliding lever of the wireless communication switch with S2302 on the **system board**.
5. Seat the **AC adaptor jack**.

4.20 VGA Board

Removing the VGA Board

To remove the VGA board, follow the steps below and refer to Figure 4-42.

1. Remove **three M2×4 screws** securing the **VGA board**.
2. Gently lift up the **VGA board** to disconnect it from **PJ100** on the **system board**.

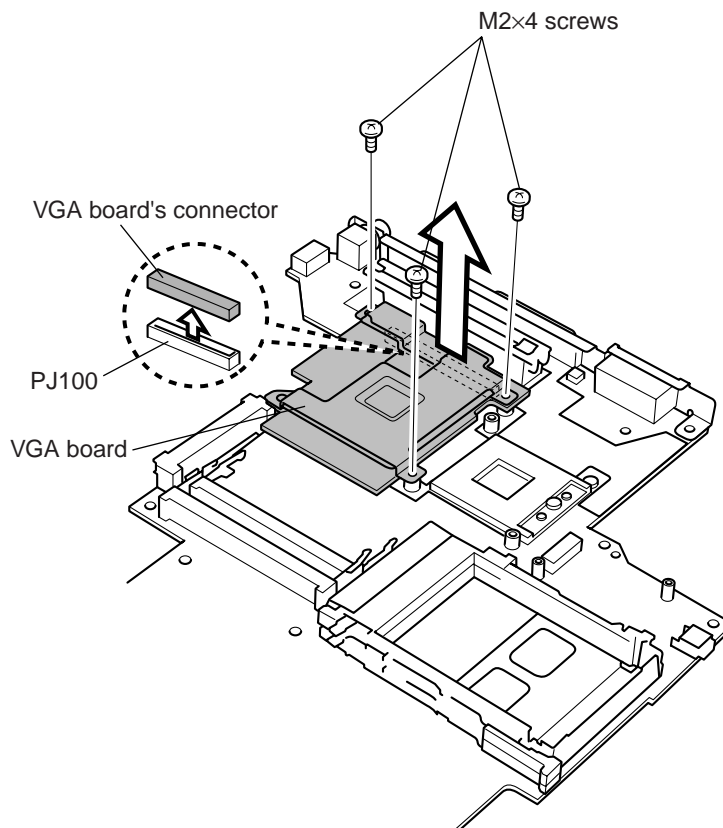


Figure 4-42 Removing the VGA board

Installing the VGA Board

To install the VGA board, follow the steps below and refer to Figure 4-42.

1. Seat the **VGA board** and connect it to **PJ100** on the **system board**.
2. Secure the **VGA board** with **three M2×4 screws**.

4.21 USB Board

Removing the USB Board

To remove the USB board, follow the steps below and refer to Figure 4-43.

1. Remove **one M2×4 screw** securing the **USB board**.
2. Remove the **USB board**.

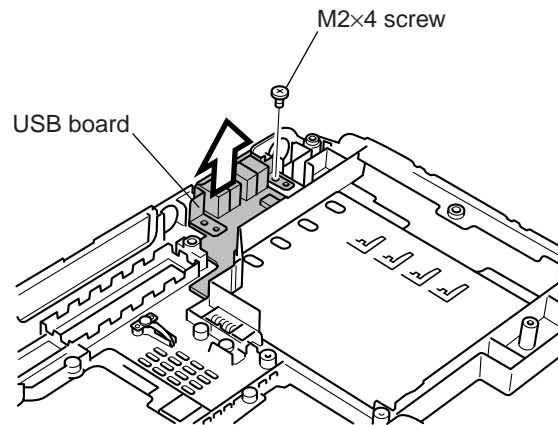


Figure 4-43 Removing the USB board

Installing the USB Board

To install the USB board, follow the steps below and refer to Figure 4-43.

1. Seat the **USB board** and secure it with **one M2×4 screw**.

4.22 Display Mask

Removing the Display Mask

To remove the display mask, follow the steps below and refer to Figures 4-44 and 4-45.

1. Remove **two mask seals** at the bottom corners of the display assembly.
2. Remove **two M2.5×6 black flat-head screws** securing the **display mask**.

NOTE: Support the display with your hand when you remove the screws.

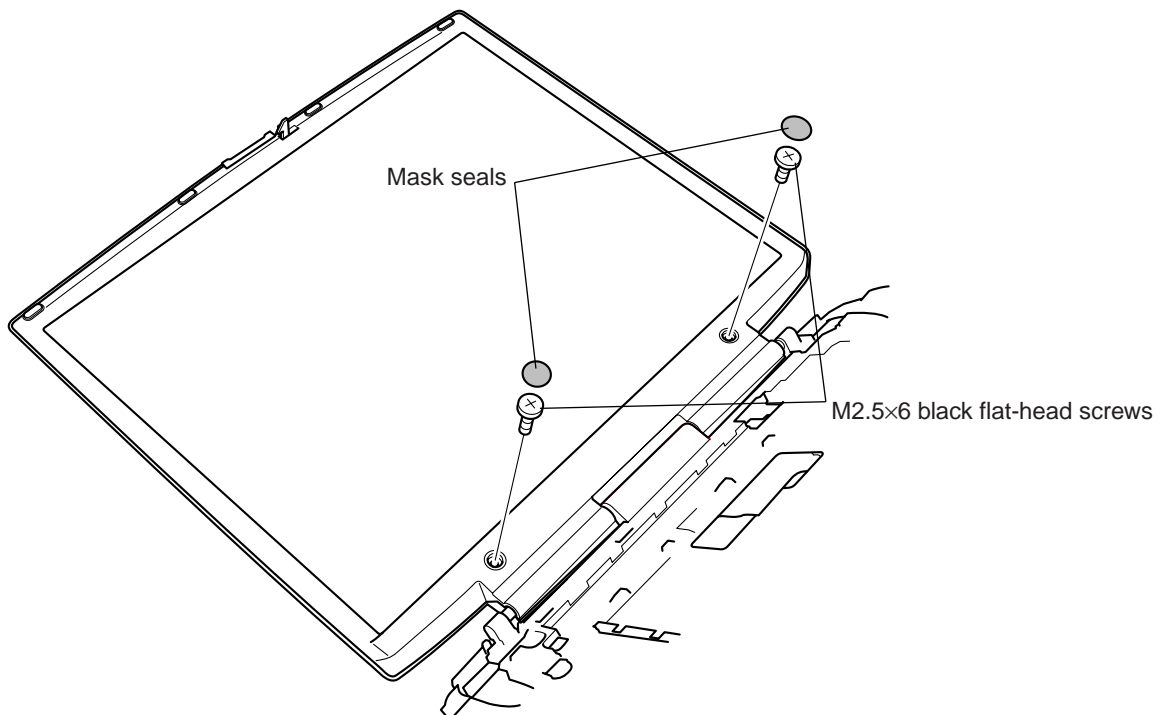


Figure 4-44 Removing the screws on the display mask

3. Release the **twenty-seven latches** on the **display mask** in the following order:
 - Seven latches on the bottom
 - six latches each on the right and left sides
 - eight latches on the top.

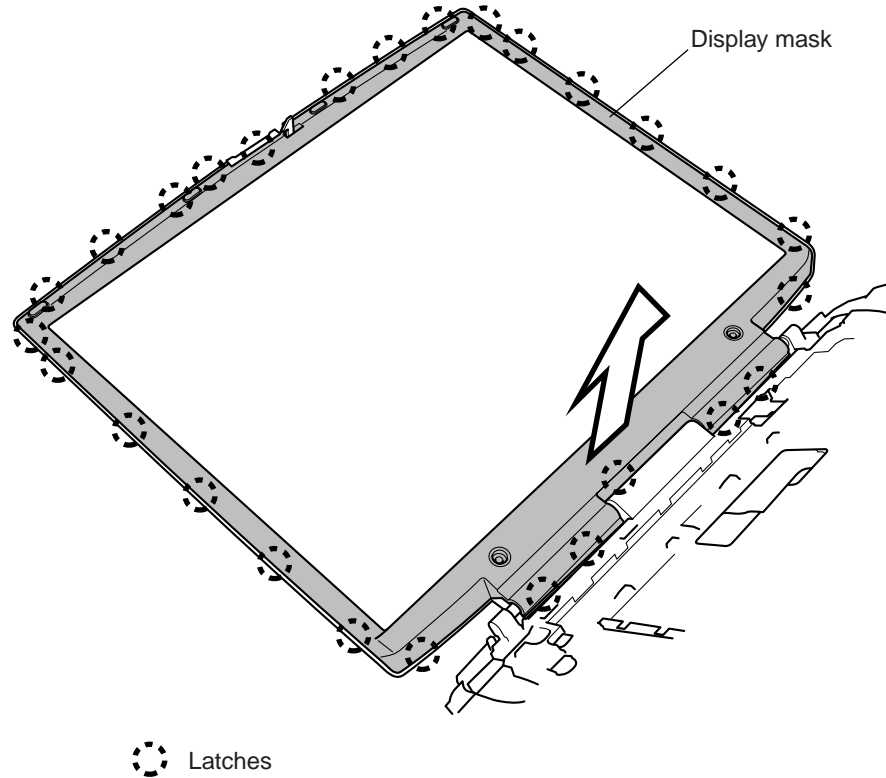


Figure 4-45 Removing the display mask

Installing the Display Mask

To install the display mask, follow the steps below and refer to Figures 4-44 and 4-45.

1. Place the **display mask** in position, and fasten the **twenty-seven latches** in the following order:
 - Eight latches on the top
 - Six latches each on the right and left sides
 - Seven latches on the bottom.
2. Secure the **display mask** with **two M2.5×6 black flat-head screws**.

NOTE: *Hold the display by the back with your hand while tightening the screws.*

3. Set **two mask seals** back on the screws.

4.23 FL Inverter Board

Removing the FL Inverter Board

To remove the FL inverter board, follow the steps below and refer to Figures 4-46 and 4-47.

1. Remove **one M2×4 flat-head screw** securing the **FL inverter board**.
2. Turn over the **insulator** securing the **HV cable**.

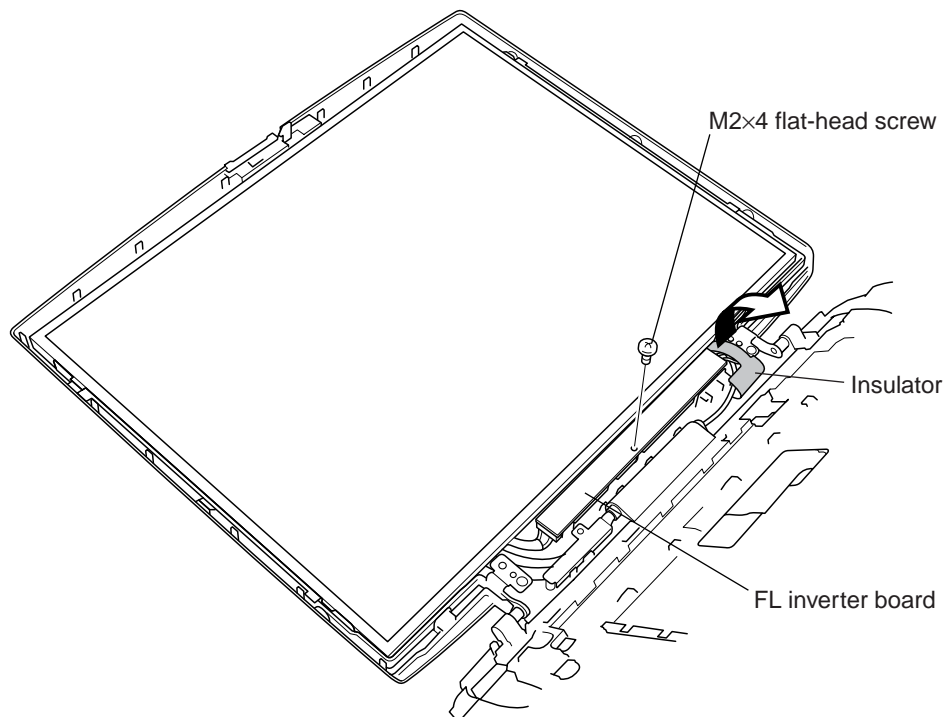


Figure 4-46 Removing the screw from the FL inverter board

3. Rotate out the **FL inverter board** and disconnect the **FL cable** from **CN1** on the **FL inverter board**.
4. Disconnect the **HV cable** from **CN2** on the **FL inverter board**.
5. Remove the **FL inverter board**.

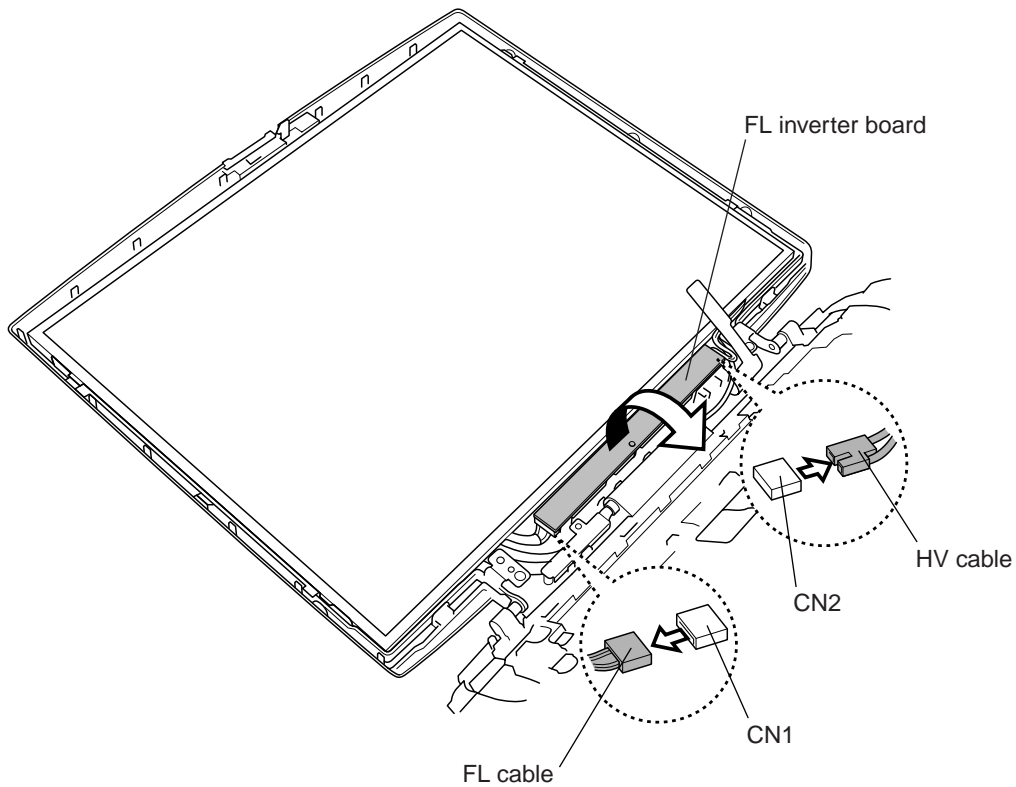


Figure 4-47 Removing the FL inverter board

Installing the FL Inverter Board

To install the FL inverter board, follow the steps below and refer to Figures 4-46 and 4-47.

1. Connect the **FL inverter cable** to **CN1** and the **HV cable** to **CN2**.
2. Seat the **FL inverter board**.
3. Secure the **FL inverter board** with **one M2×4 flat-head screw**.
4. Secure the **HV cable** with the **insulator**.

4.24 LCD Module

NOTE: Be careful not to apply pressure to the ICs along the edge of LCD module. The ICs are easily damaged.

NOTE: For environmental reasons, do not throw away a malfunctioning LCD module (or FL). Please follow local ordinances or regulations for its disposal.

Removing the LCD Module

To remove the LCD Module, follow the steps below and refer to Figures 4-48 to 4-50.

1. Remove **four masking seals** that cover the **screws**.
2. Remove **four M2×4 flat-head screws** that fasten the **LCD module**.

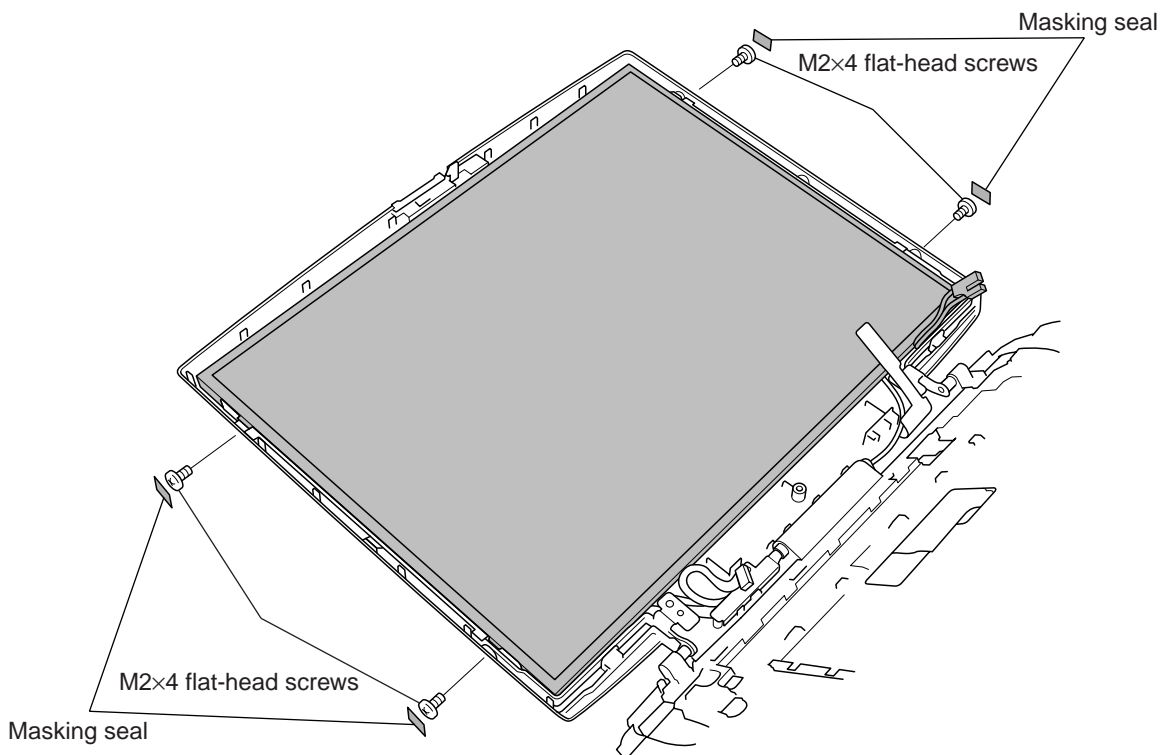


Figure 4-48 Removing the screws that secure the LCD module

3. Carefully rotate out the top of the **LCD module** to access the **LCD/FL cable**.
4. Remove the **tape** securing the **LCD/FL cable**.
5. Disconnect the **LCD/FL cable**.
6. Remove the **LCD module**.

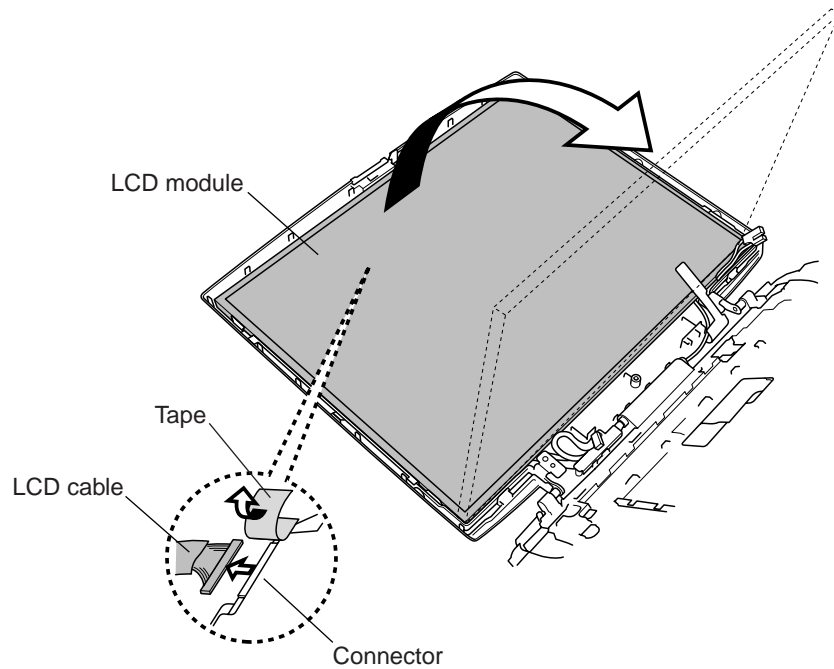


Figure 4-49 Removing the LCD module

7. Remove **four silver super flat-head M2×3 screws** securing two **metal braces**.

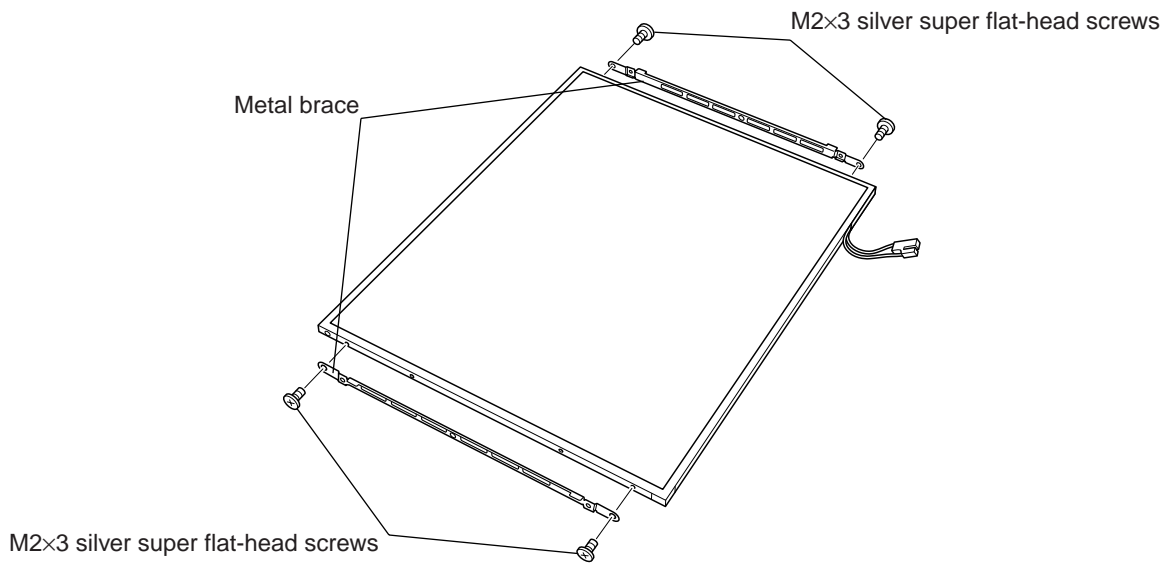


Figure 4-50 Removing the metal braces

Installing the LCD Module

To install the **LCD module**, follow the steps below and refer to Figures 4-48 to 4-50.

1. Seat **two metal braces** and secure each with **two silver super flat-head M2×3 screws**.
2. Connect the **LCD/FL cable** to the **LCD module**.
3. Secure the **LCD/FL cable** with the **tape**.
4. Seat the **LCD module** and secure it with **four M2×4 flat-head screws**.

CAUTION: Make sure the cables lie inside the guide. Be careful not to damage or pinch any cables when you seat the LCD module.

4.25 Antenna Coaxial Cables

Removing the Antenna Coaxial Cables

To remove the antenna coaxial cables, follow the steps below and refer to Figures 4-51 to 4-53.

NOTE: When you open or close the top cover, hold it by the sides close to the hinges to prevent damage.

1. Turn over the **insulator** securing the **antenna coaxial cables**.
2. Free the **antenna coaxial cables** from their **hooks**.

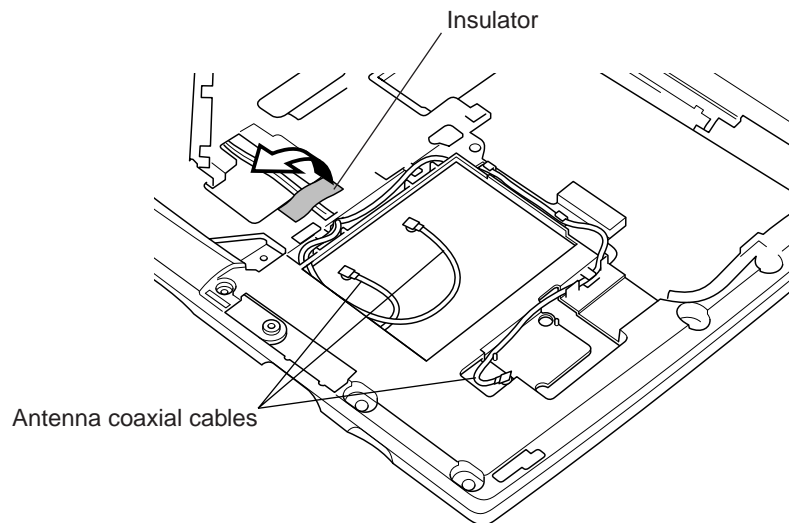


Figure 4-51 Freeing the antenna coaxial cables

3. Turn over the **insulator** securing the **antenna coaxial cables**.
4. Remove a strip of **tape** covering the **antenna coaxial cables**.
5. Free the **antenna coaxial cables** from their **groove**.
6. Remove **two M2.5×4 black flat-head screws** securing the **plastic cover**.
7. Remove the **plastic cover**.

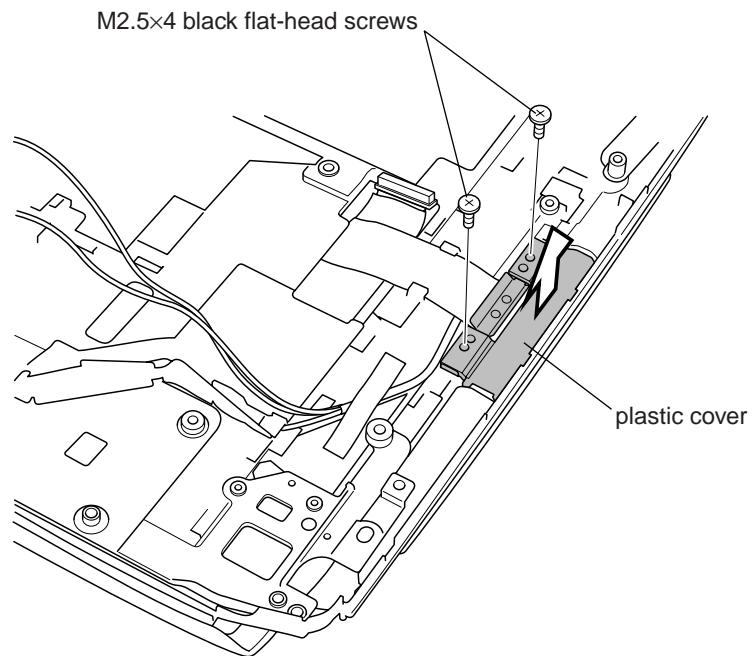


Figure 4-52 Removing the plastic cover

8. Turn the computer right side up and open the display panel.
9. Pull out the **antenna coaxial cables** from the **hinge**.
10. Remove **four strips of tape** securing the **antenna coaxial cables**.
11. Remove the **antennas**.

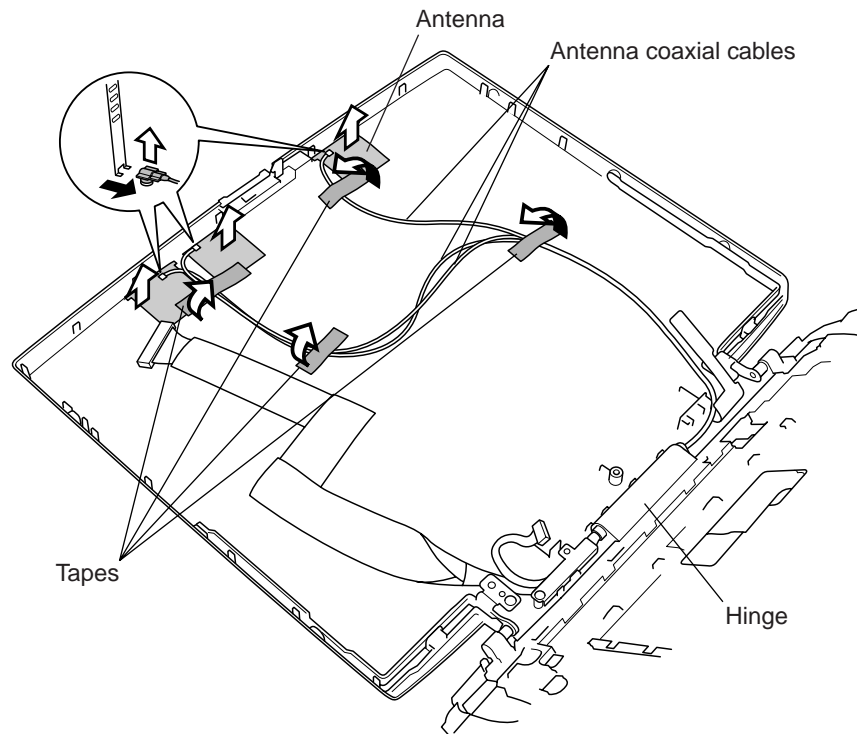


Figure 4-53 Removing the antennas

Installing the Antenna Coaxial Cables

To install the antenna coaxial cables, follow the steps below and refer to Figures 4-51 to 4-53.

1. Seat the **antennas** and route the **antenna coaxial cables**.
2. Secure the **antenna coaxial cable** with **four strips of tape**.
3. Thread the **antenna coaxial cable** through the **hinge**.
4. Close the display panel.
5. Seat the **plastic cover** and secure it with **two M2.5×4 black flat-head screws**.
6. Route the **antenna coaxial cables** through their **groove**.
7. Secure the **antenna coaxial cable** with the **insulator** and a strip of **tape**.
8. Route the **antenna coaxial cables** under the **insulator** and through their **hooks**.

4.26 LCD/FL Cable

Removing the LCD/FL Cable

To remove the LCD/FL cable and antenna coaxial cable, follow the steps below and refer to Figures 4-54 to 4-56.

NOTE: When you open or close the top cover, hold it by the sides close to the hinges to prevent damage.

1. Remove **two M2.5×4 black flat-head screws** securing the **plastic cover**.
2. Remove the **plastic cover**.

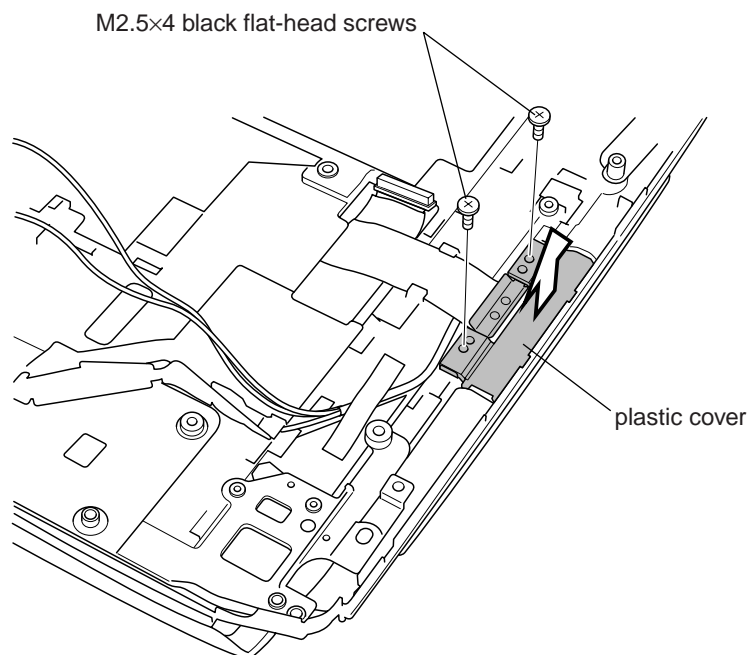


Figure 4-54 Removing the plastic cover

3. Turn the computer right side up and open the display panel.
4. Remove **one M2.5×6 tapping screw** securing the **metal brace**.
5. Remove the **metal brace**.

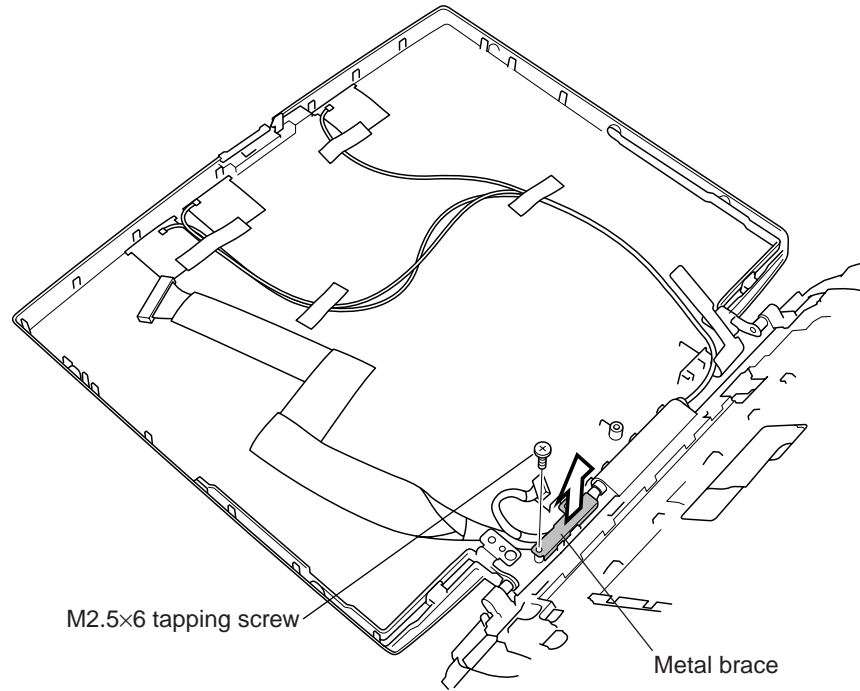


Figure 4-55 Remove the metal brace

6. Close the display panel.
7. Remove the **LCD/FL cable**.

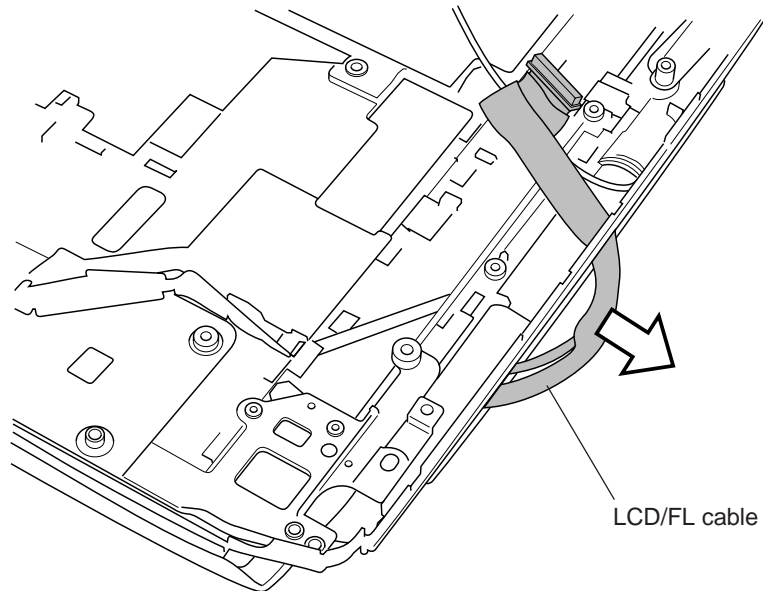


Figure 4-56 Removing the LCD/FL cable

Installing the LCD/FL Cable

To install the LCD/FL cable, follow the steps below and refer to Figures 4-54 to 4-56.

1. Route the **LCD/FL cable**.
2. Seat the **metal plate** and secure it with **one M2.5×6 tapping screw**.
3. Set the **plastic brace** and the **metal plate**.
4. Seat the **plastic cover** and secure it with **two M2.5×4 black flat-head screws**.

4.27 TFT FL (Model 14.1 XGA Samsung LTN141XF-L02)

Removing the TFT FL (Model 14.1 XGA Samsung LTN141XF-L02)

To remove the TFT FL (Model 14.1 XGA Samsung LTN141XF-L02), follow the steps below and refer to Figures 4-57 to 4-65.

1. Flip the LCD module over and remove the PCB cover and three pieces of tape.

CAUTION: Use care not to damage the PCB.

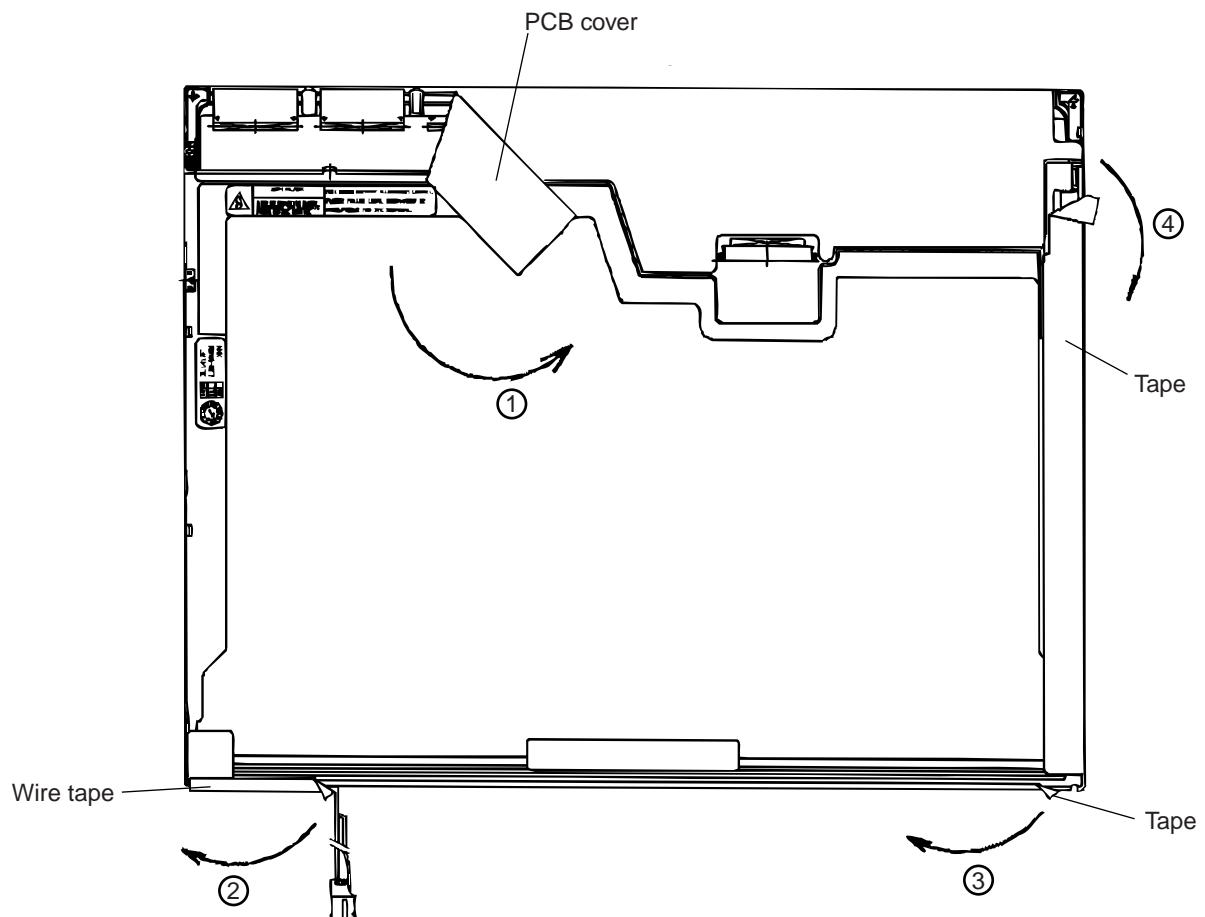


Figure 4-57 Removing the PCB cover and tape

2. Remove the two screws for fixing the power supply board.

CAUTION: Use care not to damage the PCB.

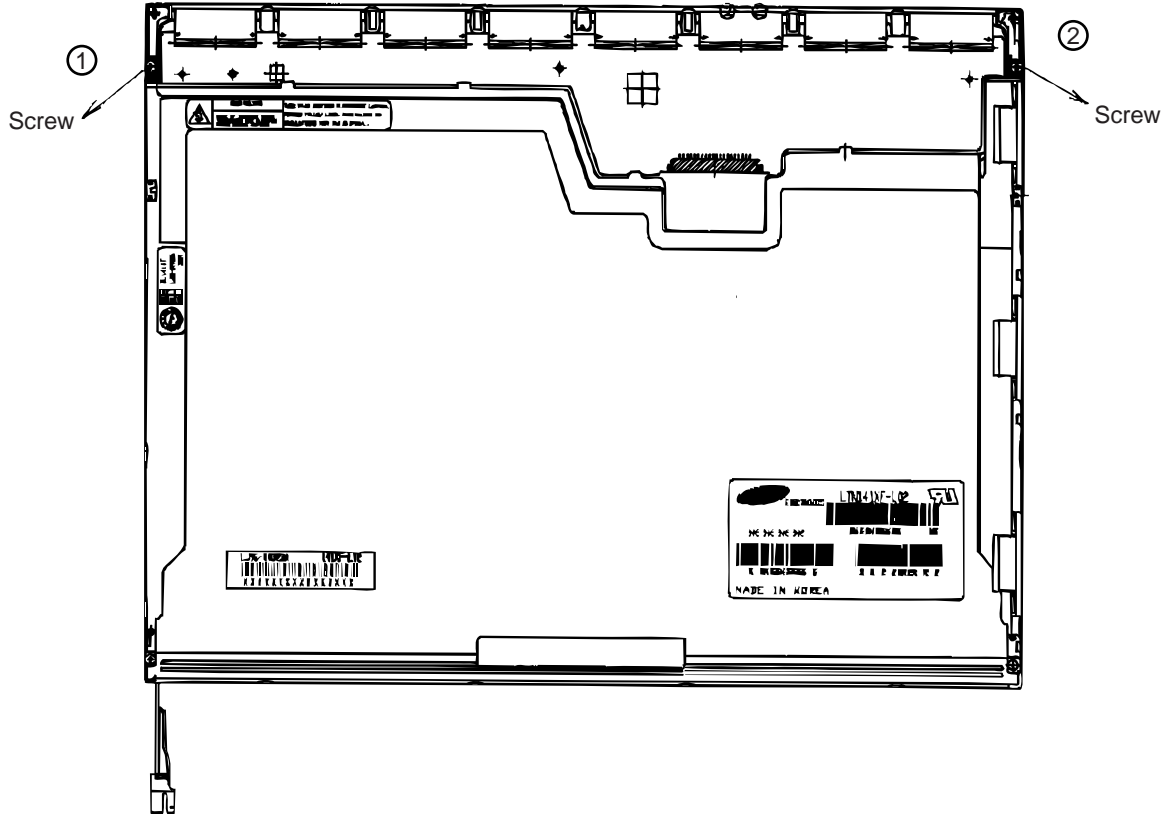


Figure 4-58 Removing the two screws for fixing the power supply board

3. Release the 18 hooks and remove the upper chassis from the frame. There are six hooks at the top, four hooks on each of the left- and right-hand sides, and four hooks at the bottom.

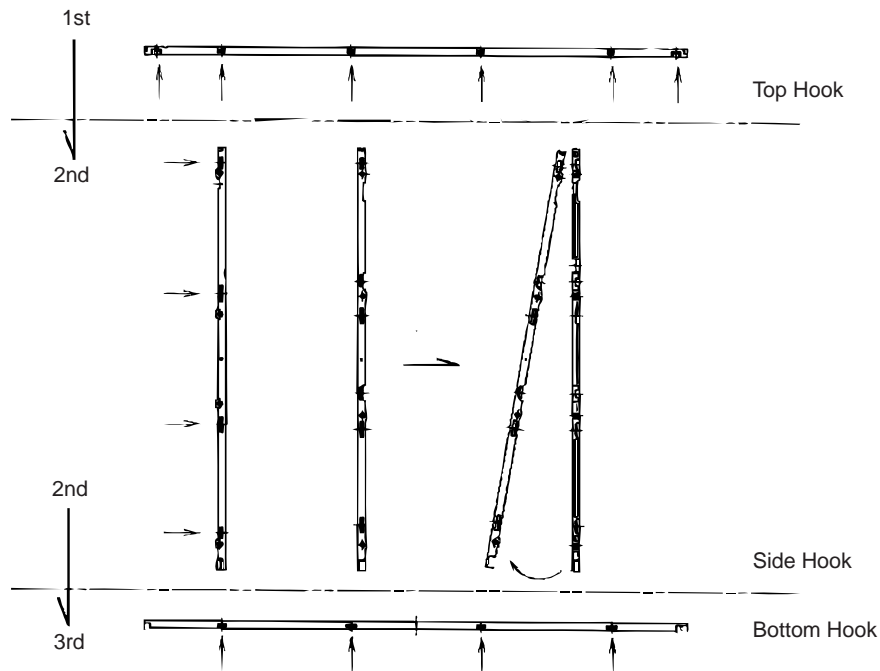


Figure 4-59 Releasing the 18 hooks

4. Remove the panel assembly from the backlight assembly.

CAUTION: Use care not to damage the TCP during working.

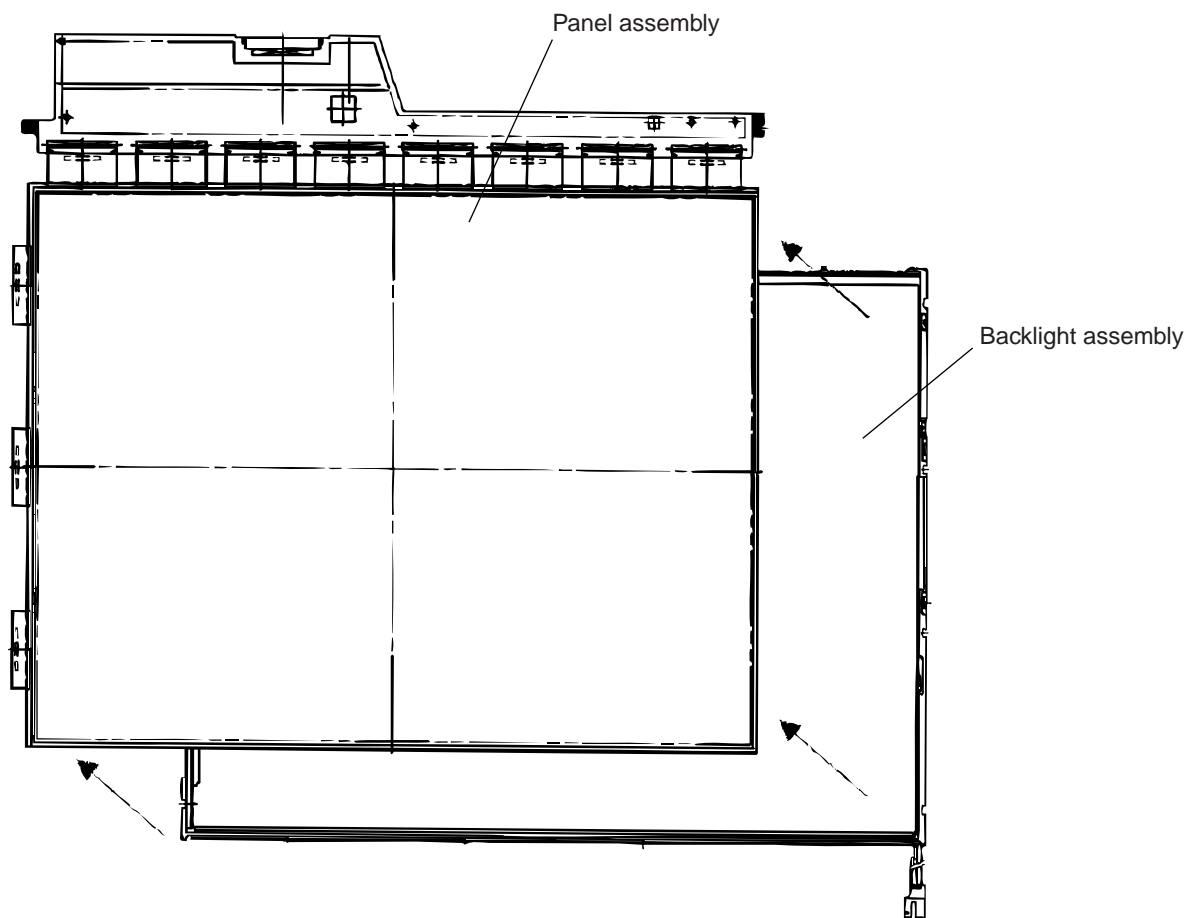


Figure 4-60 Removing the panel assembly

5. Remove the two clips.
6. Remove these:
 - Prism sheet
 - Diffuser sheet
 - Light guide plate (LGP)
 - Reflective sheet

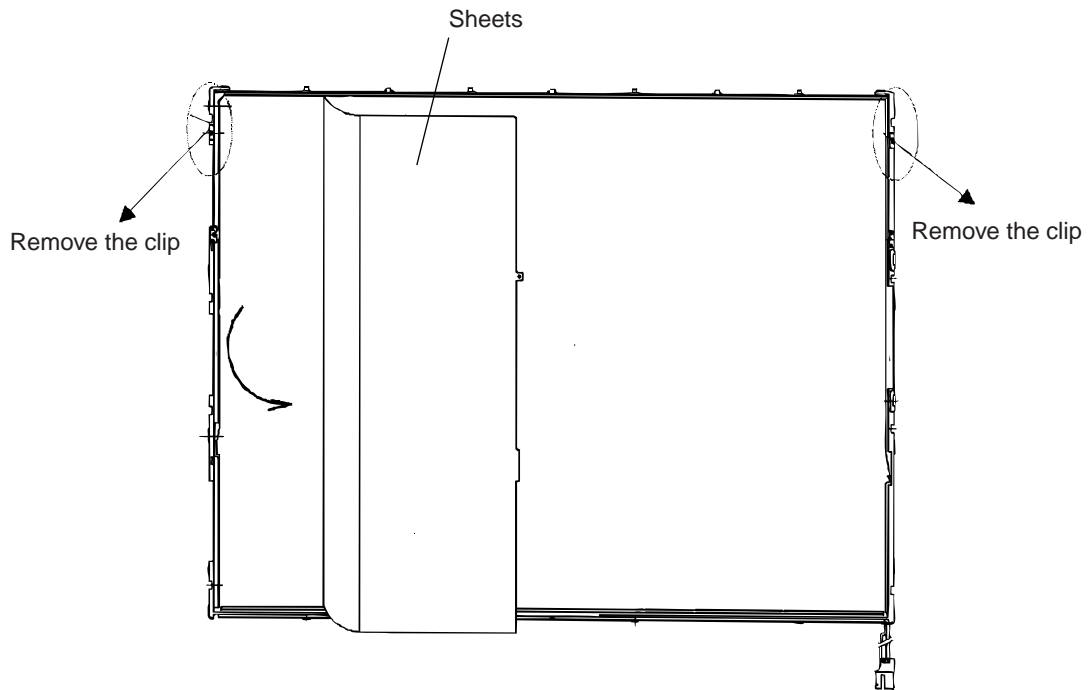


Figure 4-61 Removing the panel assembly

7. Remove the two screws for fixing the back cover of the FL tube.

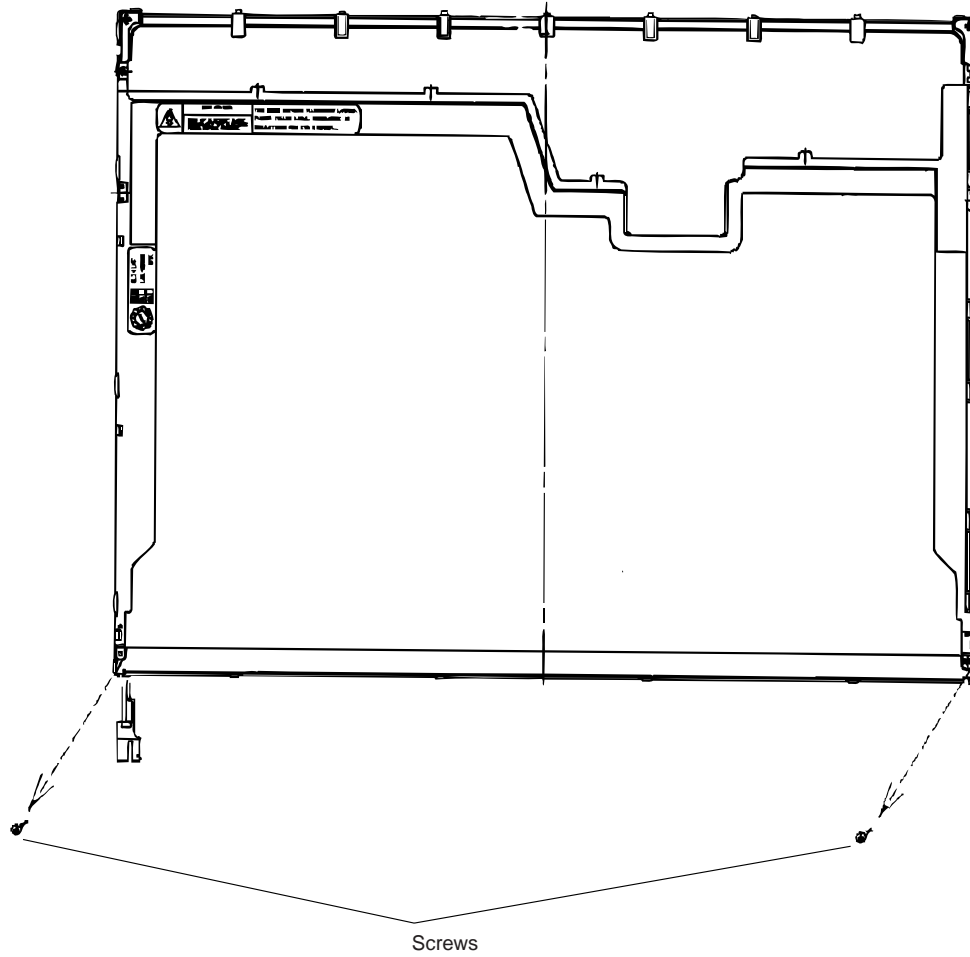


Figure 4-62 Removing the screws for fixing the FL tube back cover

8. Disconnect the ground wire of the FL tube from the frame.

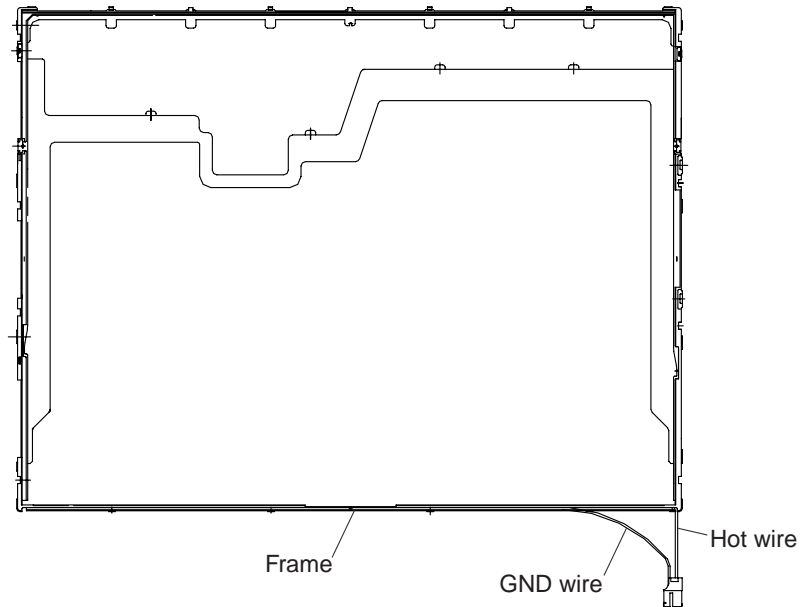


Figure 4-63 Disconnecting the FL tube ground wire

9. Remove the FL tube from the frame.

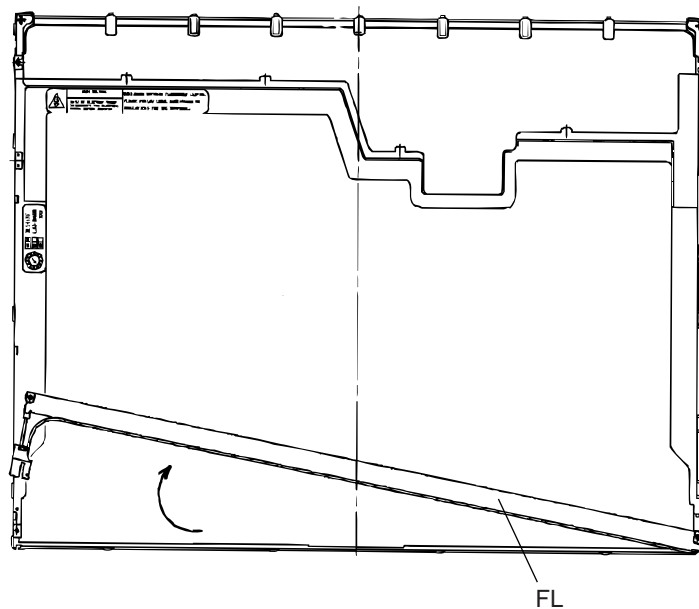


Figure 4-64 Removing the FL tube

Installing the TFT FL (Model 14.1 XGA Samsung LTN141XF-L02)

To install the TFT FL (Model 14.1 XGA Samsung LTN141XF-L02), follow the steps below and refer to Figures 4-57 to 4-65.

1. Place the FL tube on the correct location in the frame.
2. Connect the ground wire to the frame.
3. Fix the back cover of the FL tube with the two screws.
4. Attach these:
 - Reflective sheet
 - Light guide plate (LGP)
 - Diffuser sheet
 - Prism sheet
5. Fasten the two clips.
6. Place the panel assembly on the correct location in the backlight assembly.
7. Place the upper chassis on the frame. Fit the hooks into the holes. There are four hooks at the bottom, four hooks on each of the left- and right-hand sides, and six hooks at the top.
8. Fix the power supply board with the two screws.
9. Attach the PCB cover and three pieces of tape.

4.28 TFT FL (Model 14.1 XGA LG. Philips LP141X7-C1TO)

Removing the TFT FL (Model 14.1 XGA LG. Philips LP141X7-C1TO)

To remove the TFT FL (Model 14.1 XGA LG. Philips LP141X7-C1TO), follow the steps below and refer to figures 4-66 to 4-69.

Removing the outside tape/cover tape

1. Remove the tape adhesive (1) used for the B/L wire fixing.

CAUTION: *Pressure or stress should not be given on the B/L wire*

2. Remove the tape adhesive (2) used for the top case fixing
3. Remove the cover shield (C) (3)

CAUTION: *Pressure or stress should not be given on control the PCB*
Usage of gloves with the anti-electric discharge coating is recommended.
To eliminate possible damage on circuits occurred by the ESC.

4. Remove the cover shield (G) (4)

CAUTION: *Pressure or stress should not be given on the gate TCP*

5. Remove the tape adhesive (5), (6) used for the top case fixing.

CAUTION: *Pressure or stress should not be given on the top case during this process.*

Removing the control PCB, top case and cover assembly

6. Remove the FPC cable (1) used for the control PCB connecting.

CAUTION: Pressure or stress should not be given on the FPC cable.

7. Remove the control PCB (2).

CAUTION: At first, move the control PCB to the left

8. Remove the top case (3)

CAUTION: Pressure or stress should not be given on the top case and gate TCP

9. Remove the screw and cover assembly (4).

CAUTION: Pressure or stress should not be given on the source TCP

Maximum value of torque with screw should be below 2.0kgf.cm

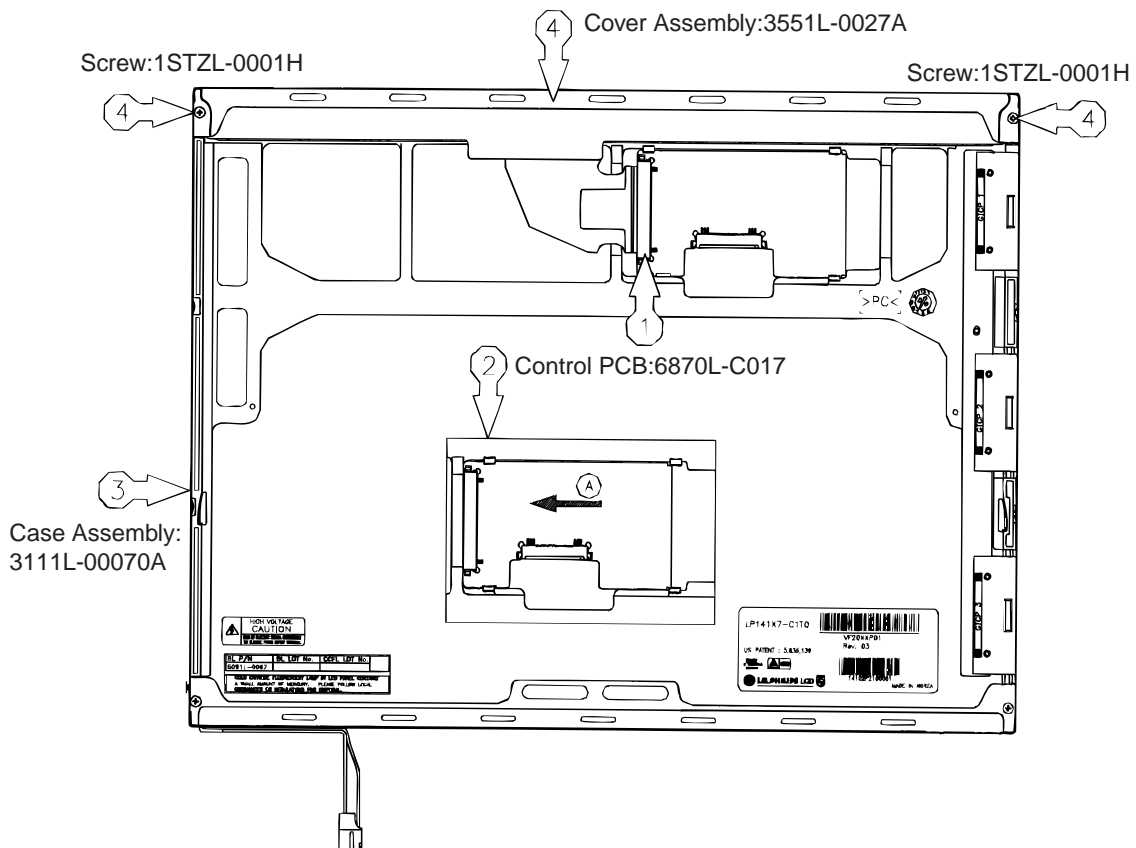


Figure 4-66 Removing the control PCB, top case and cover assembly

Removing the source PCB and gate PCB

10. Remove the source PCB (1).

CAUTION: Pressure or stress should not be given on the PCB and TCP during removing double tape.

11. Remove the gate PCB (2).

CAUTION: Pressure or stress should not be given on the PCB and TCP during removing double tape.

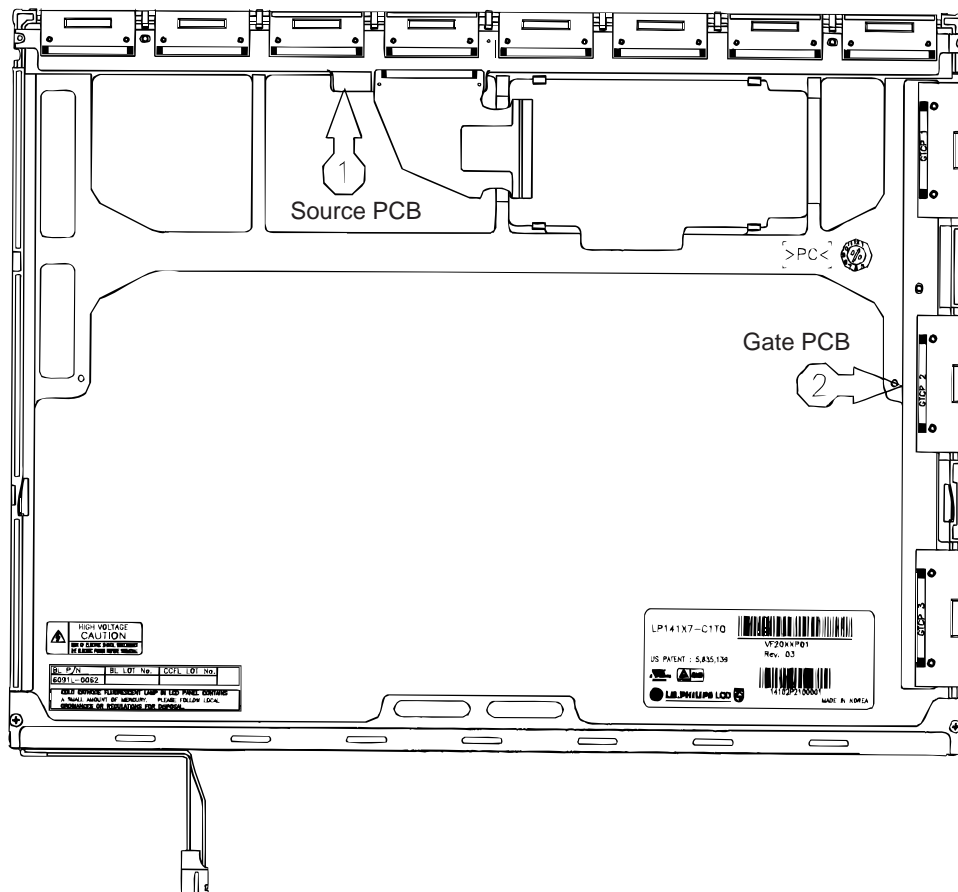


Figure 4-67 Removing the source PCB and gate PCB

Removing the board assembly, tape pad sheet, light guide, cover bottom and lamp assembly

12. Remove the board assembly (1).

CAUTION: *This process should be made in the clean room with no scratch nor particle on the Polarize and B/L assembly .*

13. Remove the tape pad (2) used for sheets fixing.

14. Remove the sheets and light guide (3).

CAUTION: *No penetration of foreign body is indispensable with no scratch on the surface of each sheet.*

15. Remove the screw and cover bottom (4).

CAUTION: *Maximum value of torque with screw should be below 2.0kgf.cm*

16. Disconnect the low voltage wire from mold frame and disassembly of the lamp assembly from mold frame (5).

CAUTION: *Pressure or stress should not be given on this wire.
Glue or foreign body of the double tape should not be attached in the mold frame.*

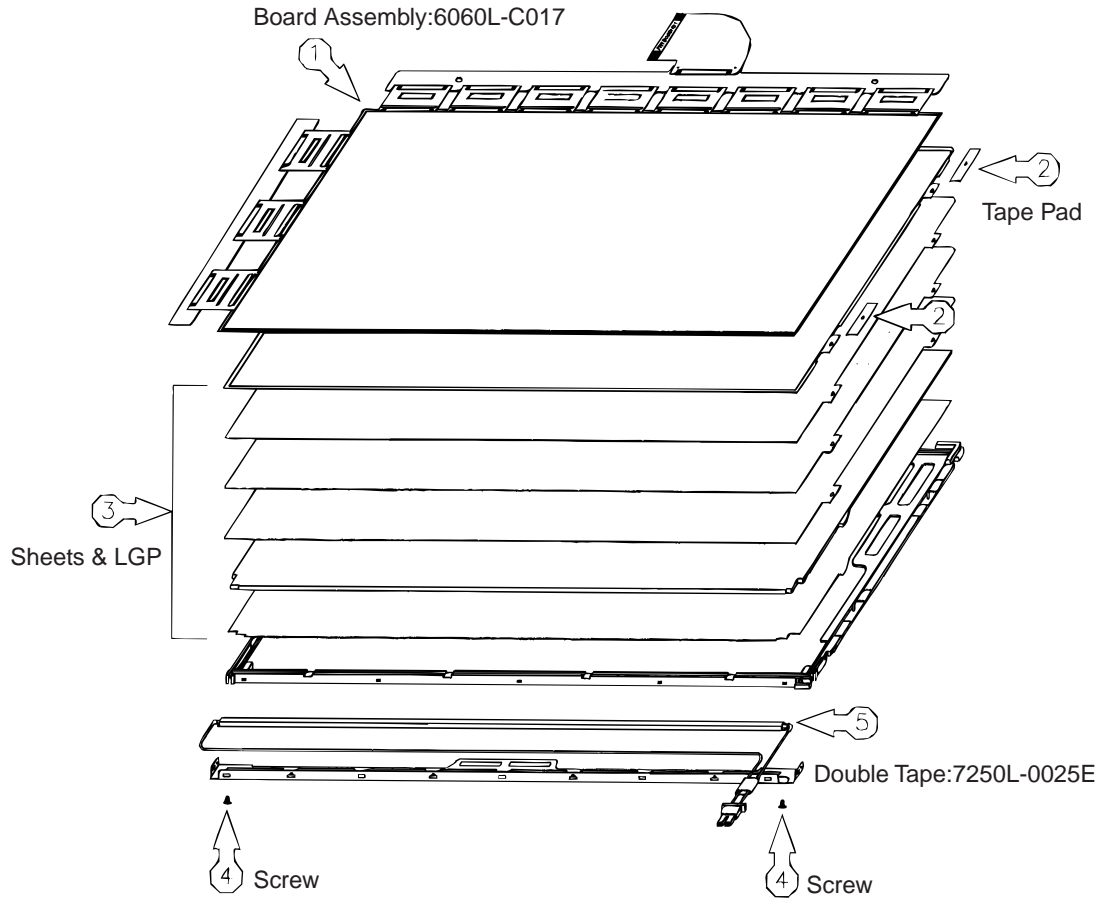


Figure 4-68 Removing the board assembly, tape pad sheet, light guide, cover bottom and lamp assembly

Installing the TFT FL (Model 14.1 XGA LG. Philips LP141X7-C1TO)

To install the TFT FL (Model 14.1 LG. XGA Philips LP141X7-C1TO), follow the steps below and refer to figures 4-69 to 4-72.

Attaching the double tape, lamp assembly, cover bottom, sheets, light guide, tape adhesive and board assembly

1. Attach the lamp assembly with the double tape (1). (Lamp housing fixing)
2. Attach the lamp assembly with the mold frame and connecting the low voltage wire with the mold frame (2).

CAUTION: *Pressure or stress should not be given on the wire during this process.*

3. Connect the cover bottom with the double tape (3). (grounding)
4. Connect the kapton tape with supporter main (4). (protection of wire (G))
5. Fix the cover bottom and screw (5).

CAUTION: *Maximum value of torque with screw should be below 2.0kgf.cm.*

6. Attach the sheets and light guide (6).

CAUTION: *No penetration of foreign body is indispensable with no scratch on the surface of each sheet and light guide.*

7. Attach the tape adhesive (7) used for sheets fixing.
8. Attach the board assembly (8).

CAUTION: *Pressure or stress should not be given on the PCB and TCP.*

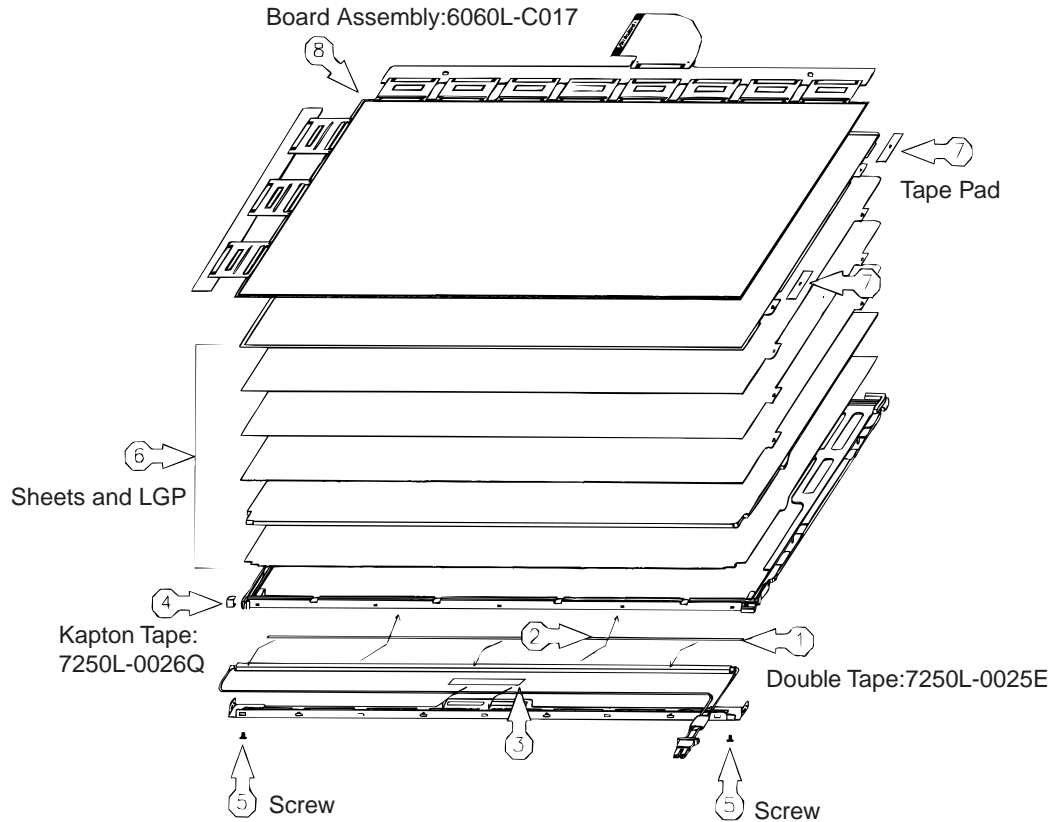


Figure 4-69 Attaching the double tape, lamp assembly, cover bottom, sheets, light guide, tape adhesive and board assembly

Attaching the source PCB and gate PCB

9. Attach the source PCB (1).

CAUTION: Stress should not be given on the TCP.

10. Attach the gate PCB (2).

CAUTION: Stress should not be given on the TCP.

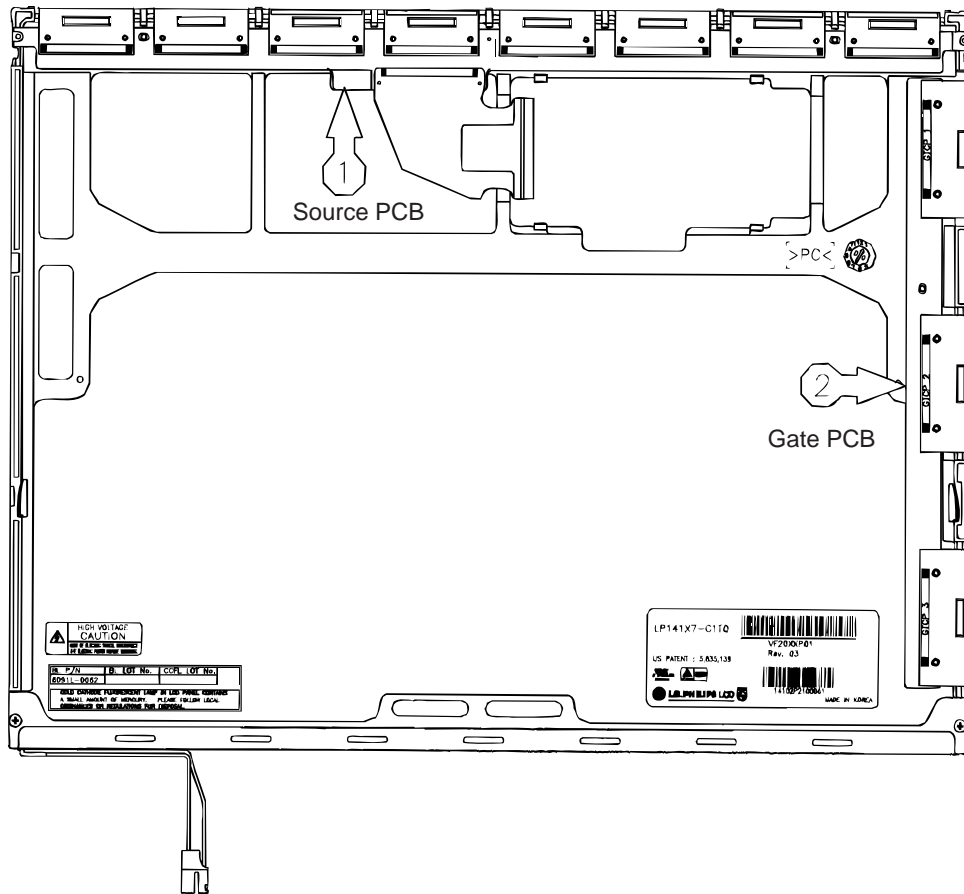


Figure 4-70 Attaching the source PCB and gate PCB

Attaching the cover bottom, screw, top case, control PCB and FPC

11. Attach the bottom cover and screw (1).

CAUTION: Pressure should not be given on the source TCP.

12. Attach the top case (2).

CAUTION: Pressure should not be given on the gate TCP.

13. Attach the control PCB (3).

CAUTION: Move the control PCB to the right.

14. Attach the FPC cable (4) used for the control PCB connecting.

CAUTION: Pressure or stress should not be given on the FPC cable.

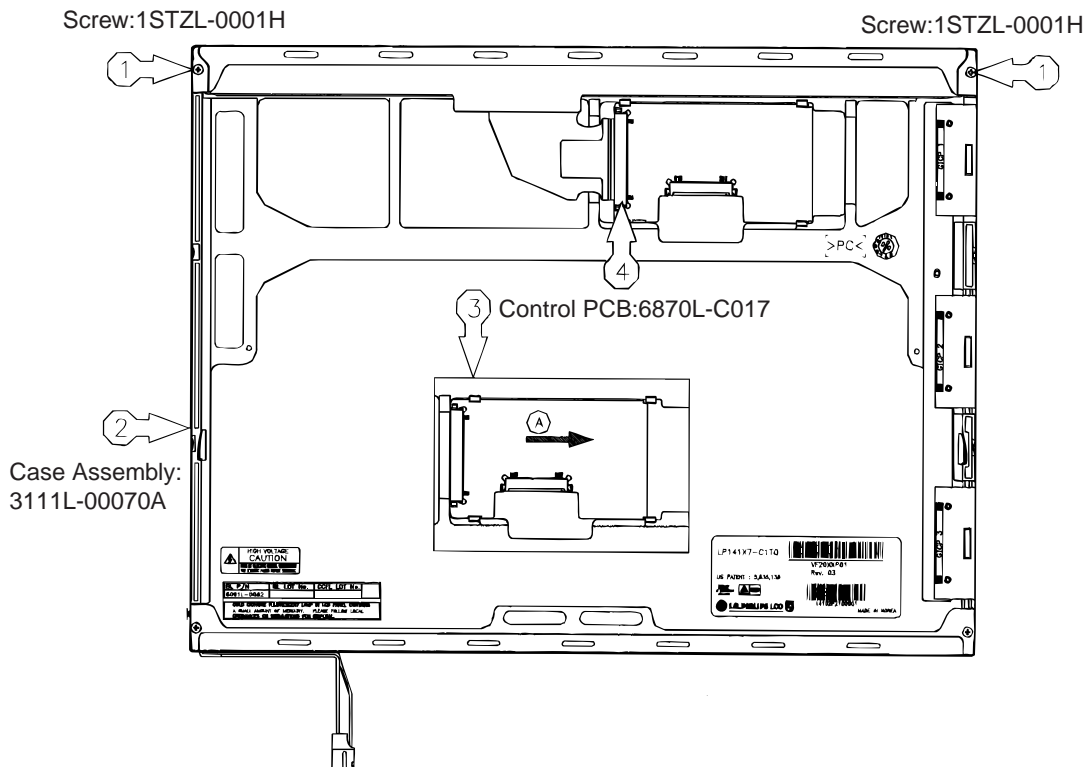


Figure 4-71 Attaching the cover bottom, screw, top case, control PCB and FPC

Attaching the outside tape and cover shield

15. Attach the tape adhesive (1) used for B/L wire fixing.

CAUTION: *Pressure or stress should not be given on the B/L wire fixing.*

16. Attach the tape adhesive (2) used for top case fixing.

17. Attach the cover shield (3).

CAUTION: *Pressure or stress should not be given on the control PCB.*

Usage of the gloves with anti-electric discharge coating is recommended to eliminate possible damage on the circuits occurred by the ESC

18. Attach the cover shield (4).

CAUTION: *Pressure or stress should not be given on the gate PCB.*

19. Attach the tape adhesive (5), (6) used for the top case fixing.

CAUTION: *Pressure or stress should not be given on the top case during this process.*

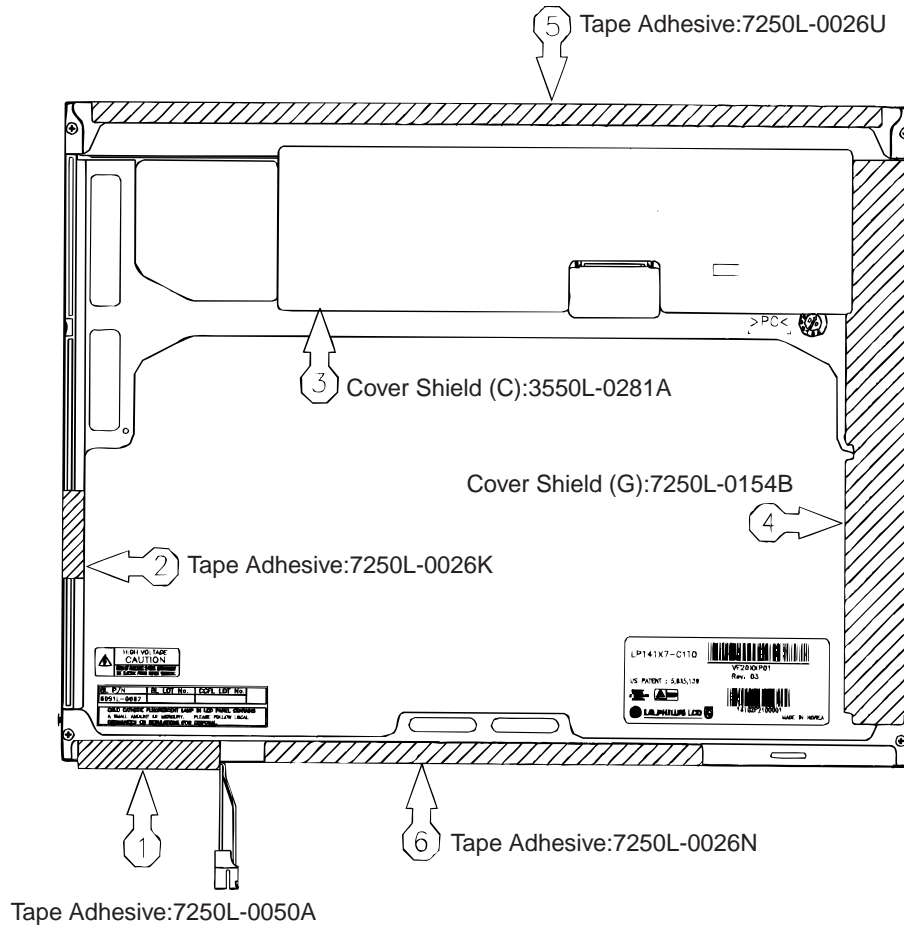


Figure 4-72 Attaching the outside tape and cover shield

4.29 TFT FL (Model 15.0 XGA Samsung LTN150X6-L01)

Removing the TFT FL (Model 15.0 XGA Samsung LTN150X6-L01)

CAUTION: Exercise care during FL removal not to damage the LCD panel and not to let dust or other foreign matter into the LCD panel. Foreign matter is detrimental to the display quality of the LCD.

To remove the TFT FL (Model 15.0 XGA Samsung LTN150X6-L01), follow the steps below and refer to Figures 4-73 to 4-81.

1. Lay the LCD panel face down and remove the **PCB cover** on the back of the LCD.

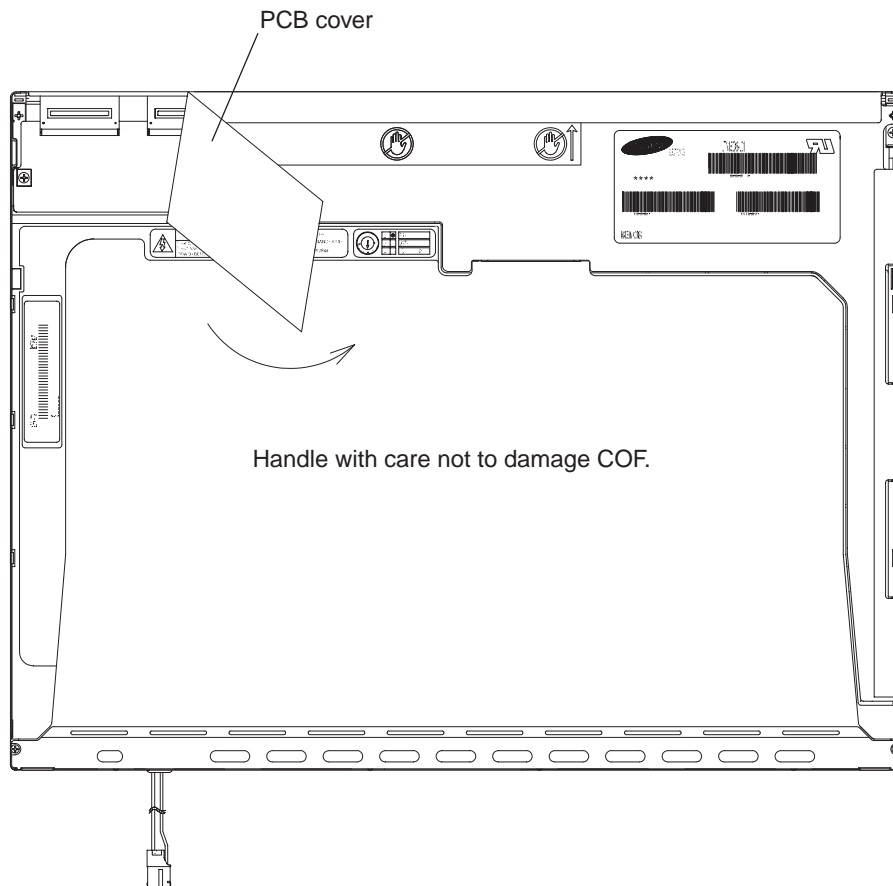


Figure 4-73 Removing the PCB cover

2. Remove **two screws** securing the PCB.

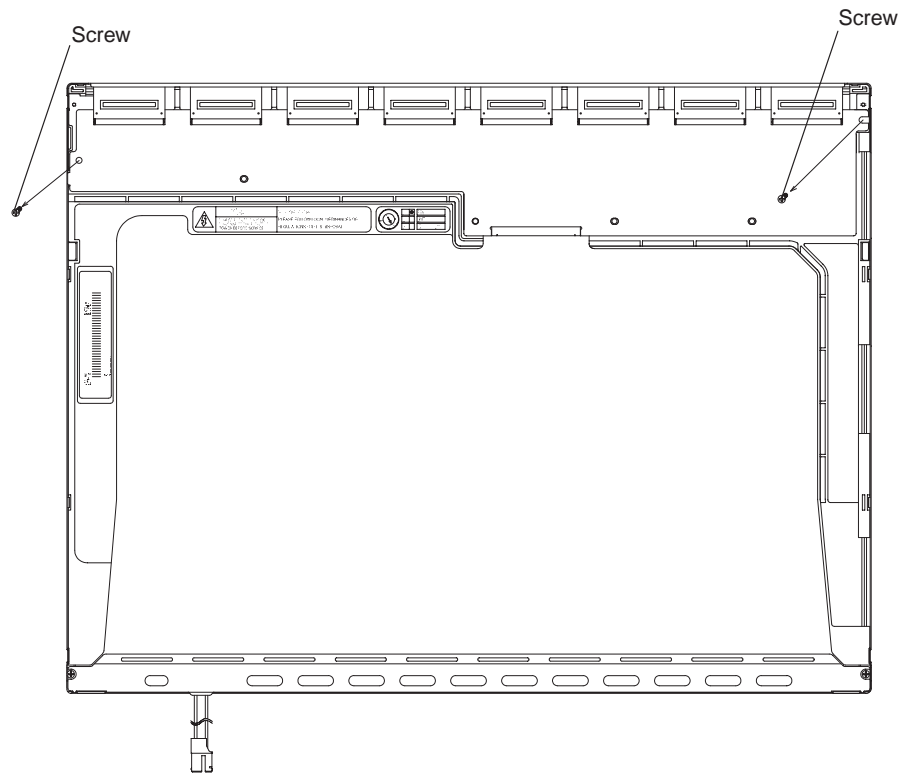


Figure 4-74 Removing the screws securing the PCB

3. Remove **four screws** on the right and left sides of the chassis.

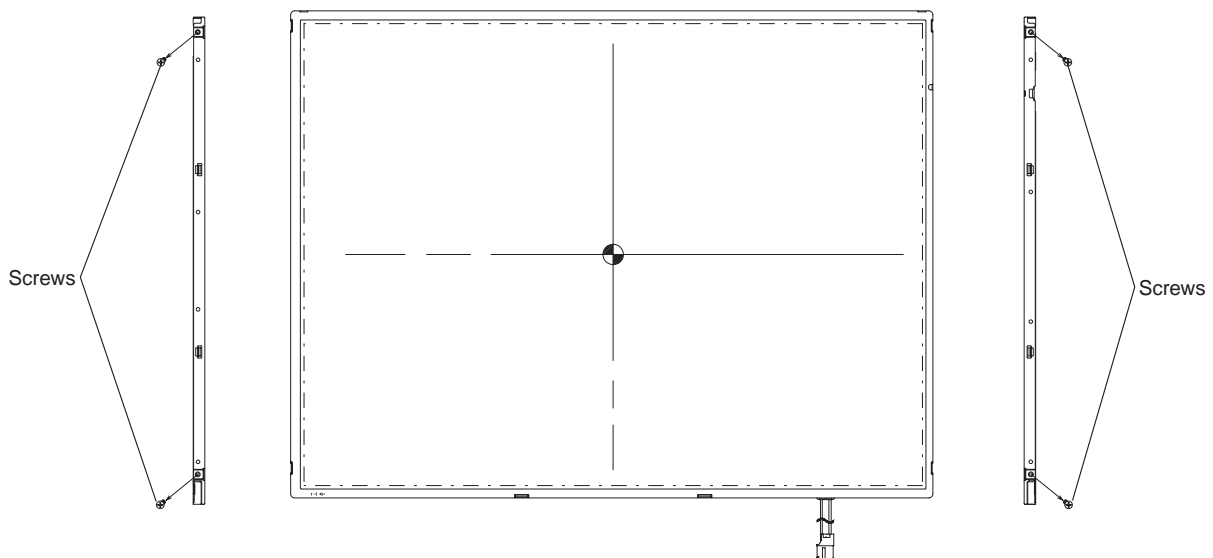


Figure 4-75 Removing screws securing the chassis

4. Release **eight hooks** (four hooks on the bottom side first and four hooks on the right and left side) and remove the top chassis from the LCD module starting from the bottom end.

CAUTION: When you release hooks on the top chassis, be careful not to apply pressure to the FL. The FL can be damaged easily.

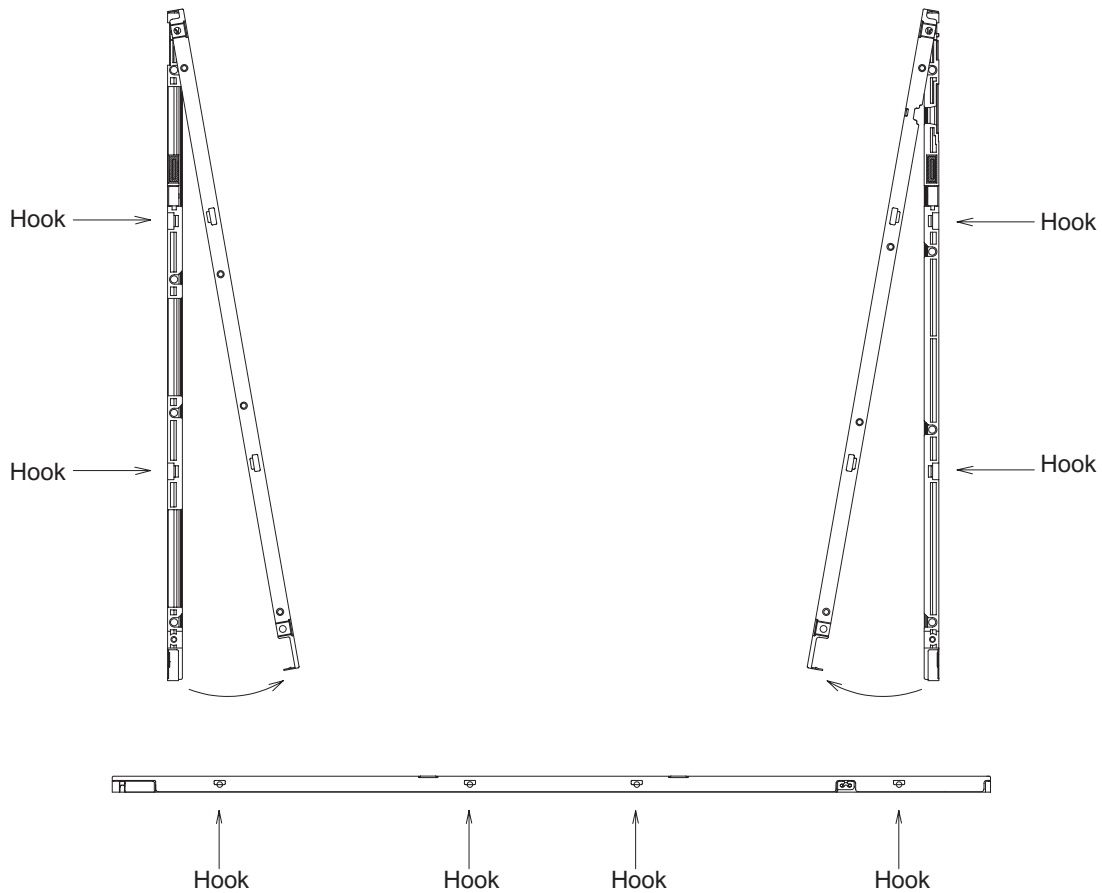


Figure 4-76 Removing the top chassis

5. Turn the LCD module face up and remove the **panel assembly** from the **mold-frame**.

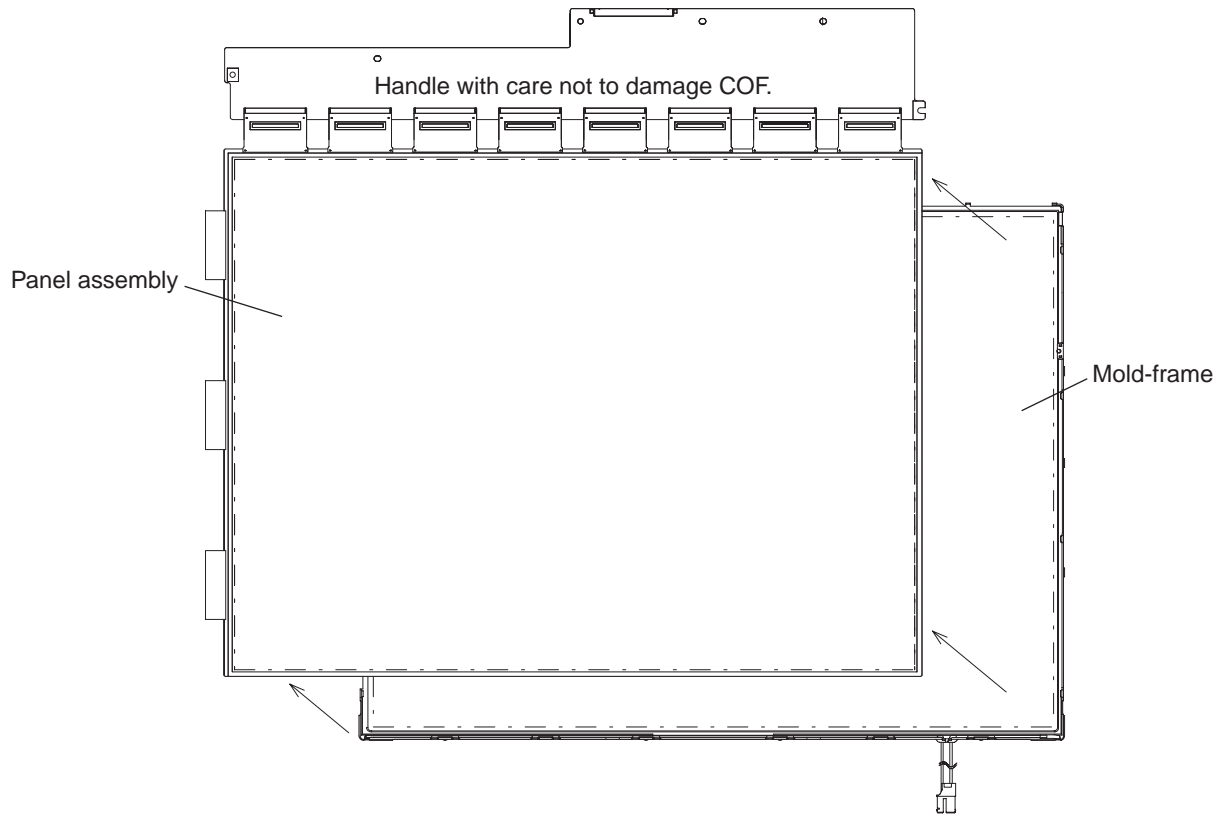


Figure 4-77 Removing the panel assembly

6. Remove **two clips** and **six sheets** (protector, prism(L,U), diffuser, LGP, and reflector sheet) from the back light assembly.

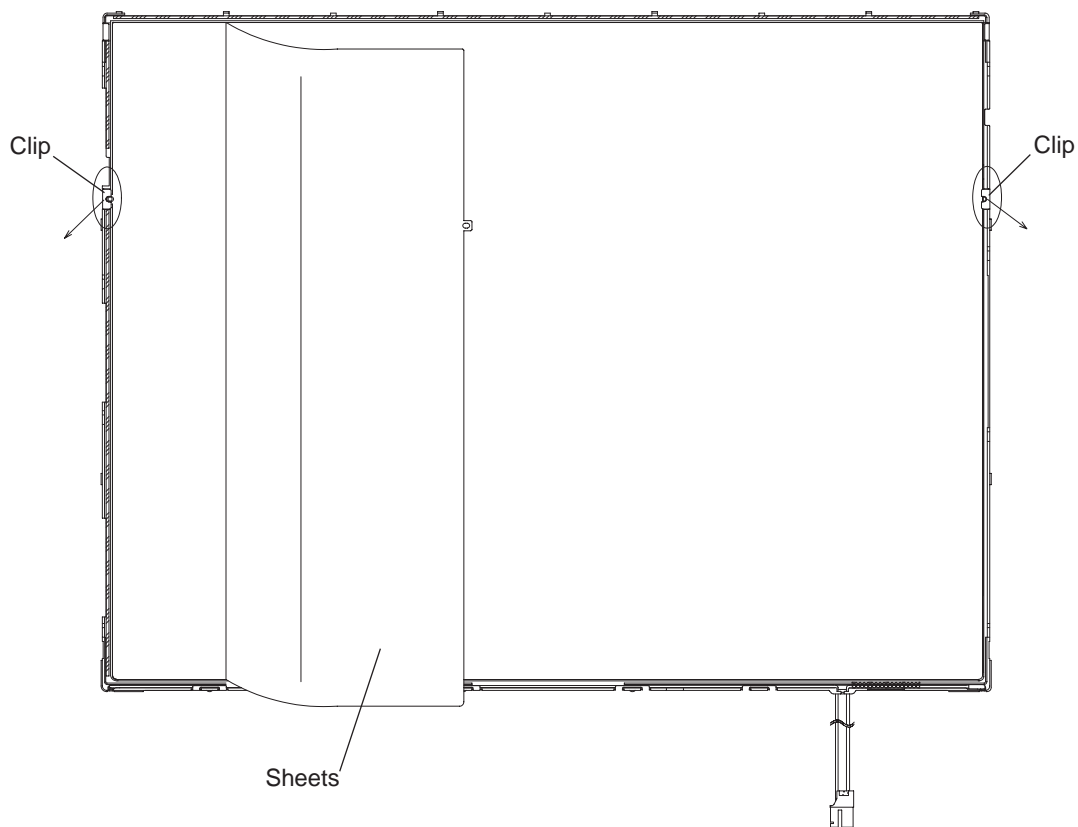


Figure 4-78 Removing one screw, two clips, tape and six sheets

7. Turn the back light assembly face down and remove **two screws** to remove the **lamp cover** from the mold frame.

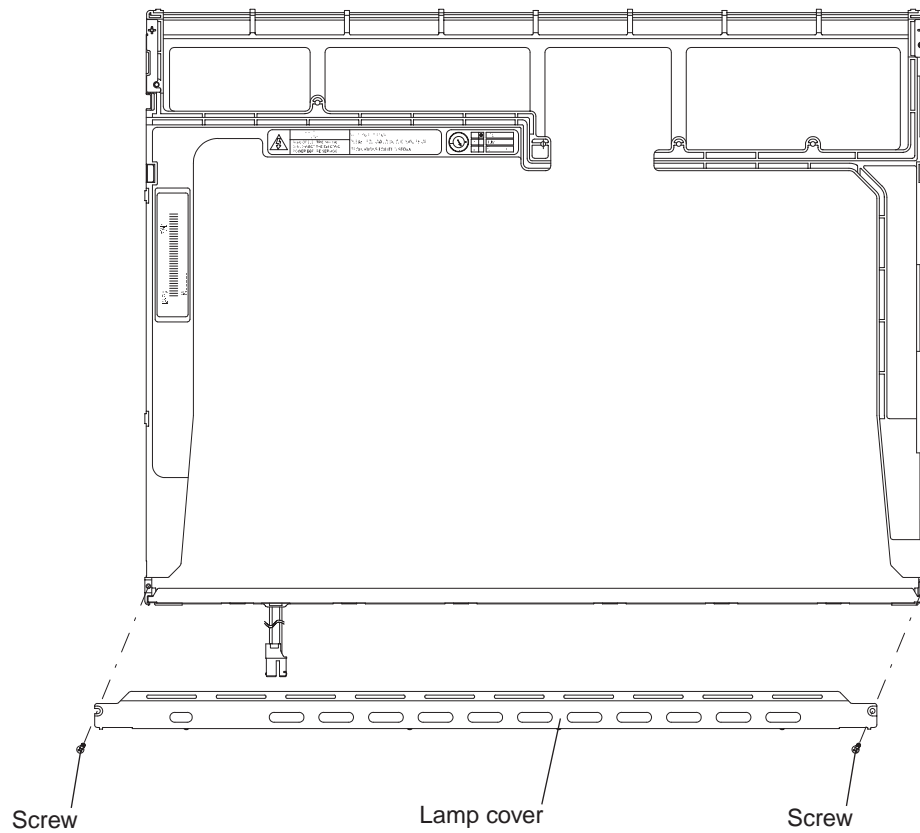


Figure 4-79 Removing the lamp cover

- Free the **HV cable** from the mold-frame's cable guide.

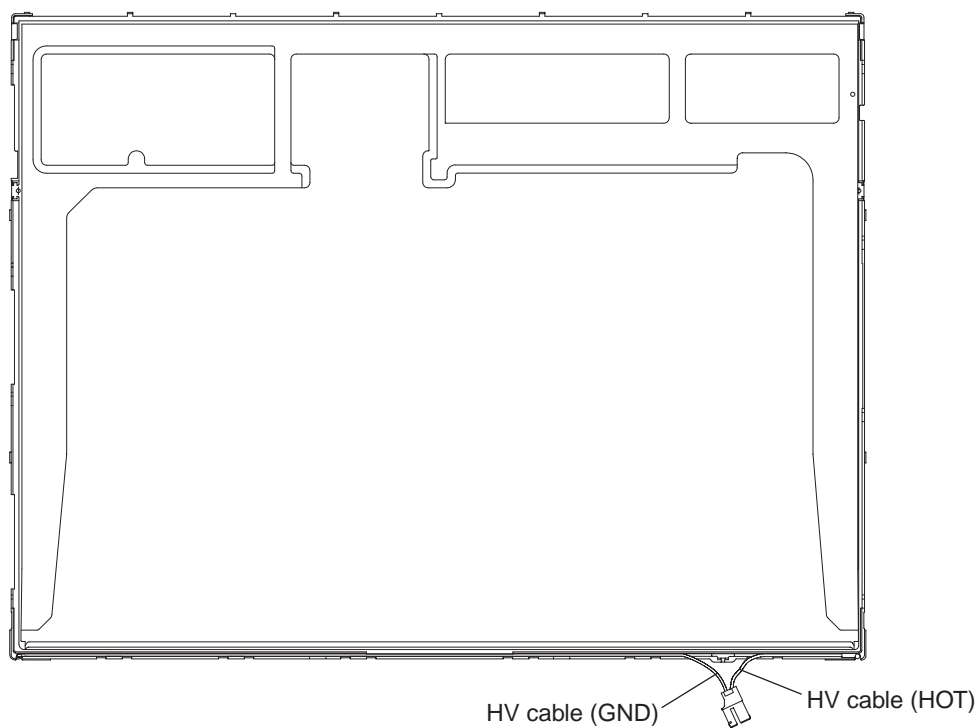


Figure 4-80 Freeing the HV cable

9. Pull the **FL assembly** out of its groove on the mold frame.

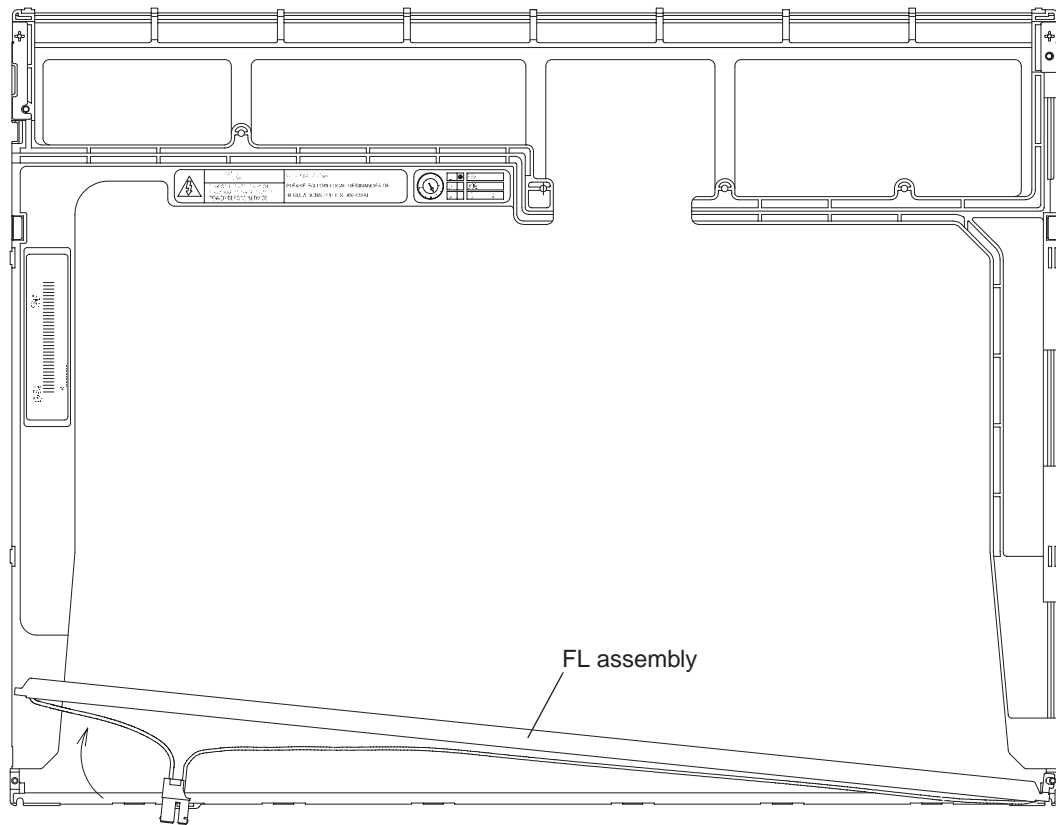


Figure 4-81 Removing the FL assembly

Installing the TFT FL (Model 15.0 XGA Samsung LTN150X6-L01)

To install the TFT FL (Model 15.0 XGA Samsung LTN150X6-L01), follow the steps below and refer to Figures 4-73 to 4-81.

1. Seat the **FL** in its groove on the mold frame.
2. Route the **HV cable** through its guide.
3. Lay the **lamp cover** on the mold frame and secure it with **two screws**.
4. Lay **six sheets** on the back light assembly and secure them with **two clips**.
5. Seat the **panel assembly** on the **back light assembly**.
6. Seat the **top chassis** and secure it with **eight hooks**.
7. Secure the chassis with **four screws**.
8. Secure the PCB with **two screws**.
9. Apply the **PCB cover** to the module.

4.30 TFT FL (Model 15.0 XGA LG. Philips LP150X06 A2)

CAUTION: When you replace the fluorescent lamp, wear finger covers or gloves to avoid contaminating or damaging the LCD panel. Be careful not to let dust or other foreign matter into the module.

Removing the TFT FL (Model 15.0 XGA LG. Philips LP150X06 A2)

To remove the TFT FL (Model 15.0 XGA LG. Philips LP150X06 A2), follow the steps below and refer to figures 4-82 to 4-85.

1. Disassembly of Tape adhesive used for B/L Wire fixing. Pressure or stress should not be given on B/L Wire.
2. Disassembly of Cover shield (G). Pressure or stress should not be given on Gate TCP.
3. Disassembly of Cover shield (C). Pressure or stress should not be given on Source PCB. Usage of gloves with anti-electric discharge coating is recommended. To eliminate possible damage on circuits occurred by ESC.
4. Disassembly of Tape shield a Tape Adhesive used for Top case fixing. Pressure or stress should not be given on Top case during this process

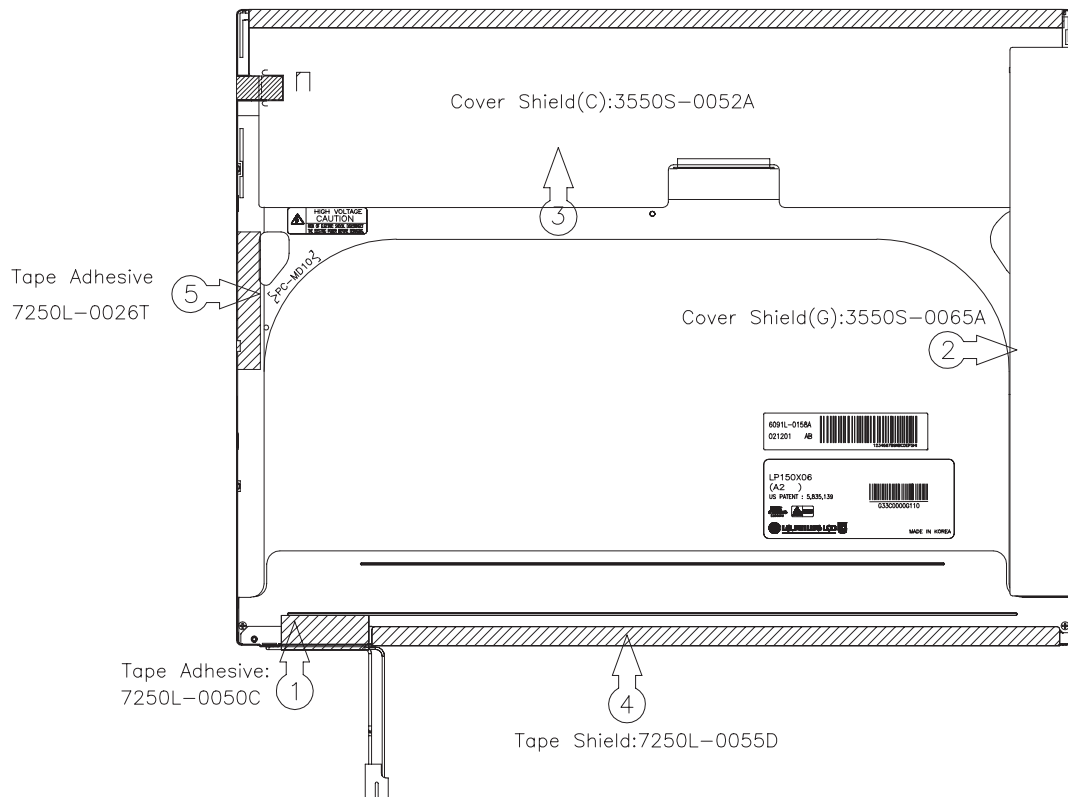


Figure 4-82 Disassembly of outside tape and cover shield

5. Disassembly of Top Case. Pressure or stress should not be given on Top Case and Gate TCP.

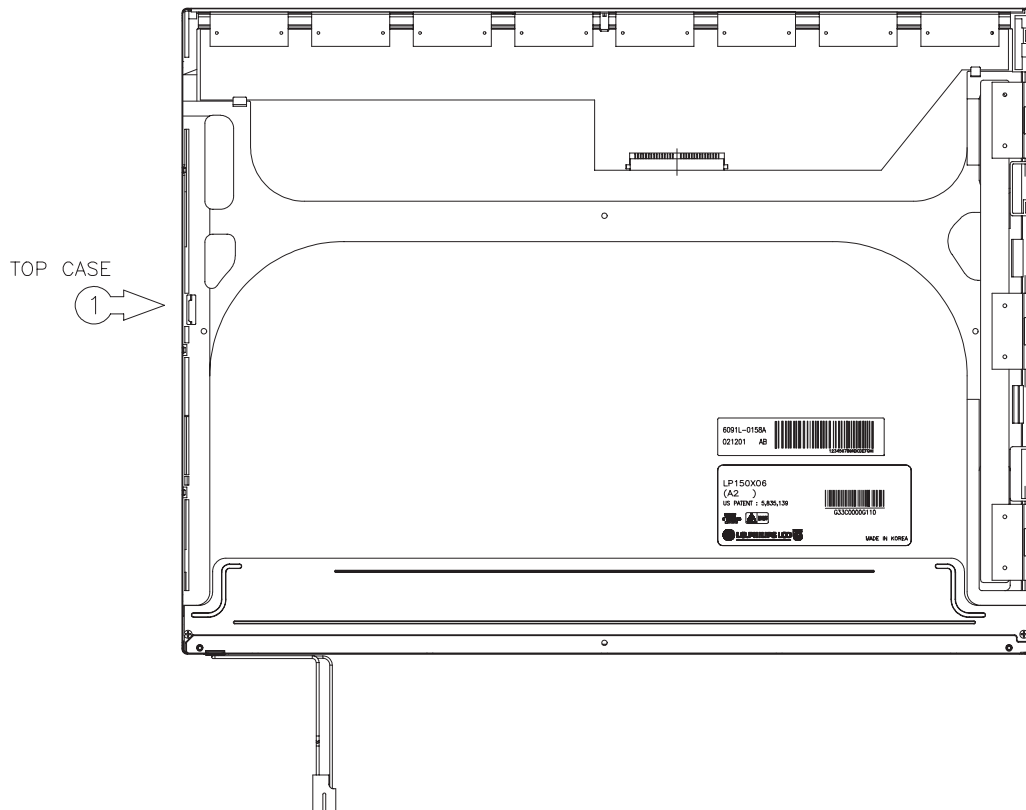


Figure 4-83 Disassembly of Top case

6. Disassembly of Source PCB. Pressure or stress should not be given on PCB and TCP during removing double tape.
7. Disassembly of Gate PCB. Pressure or stress should not be given on PCB and TCP during removing double tape.

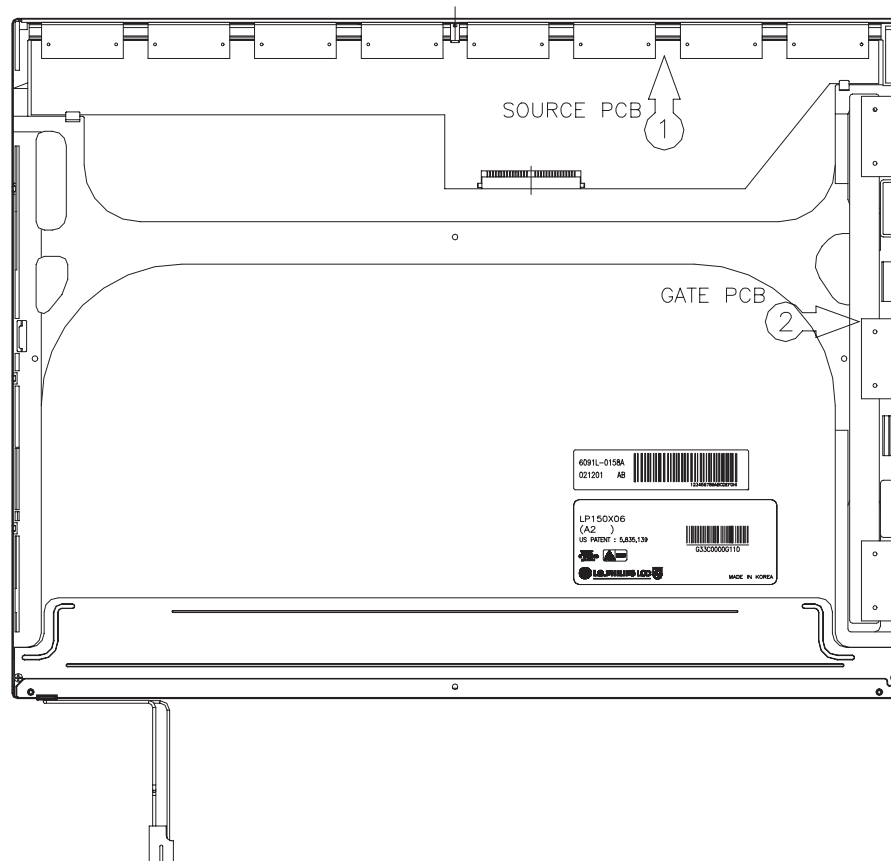


Figure 4-84 Disassembly of Source PCB and Gate PCB

8. Disassembly of Board Ass'y. This process should be made in Clean room with no scratch nor particle on Polarizer and B/L Ass'y.
9. Disassembly of Tape Adhesive used for Sheets fixing (4 Point).
10. Disassembly of Sheets and Light guide. No penetration of foreign body is indispensable with no scratch on the surface of each Sheets.
11. Disassembly of Screw and Cover Ass'y bottom (L). Maximum value of torque with Screw should be below 1.5kg.

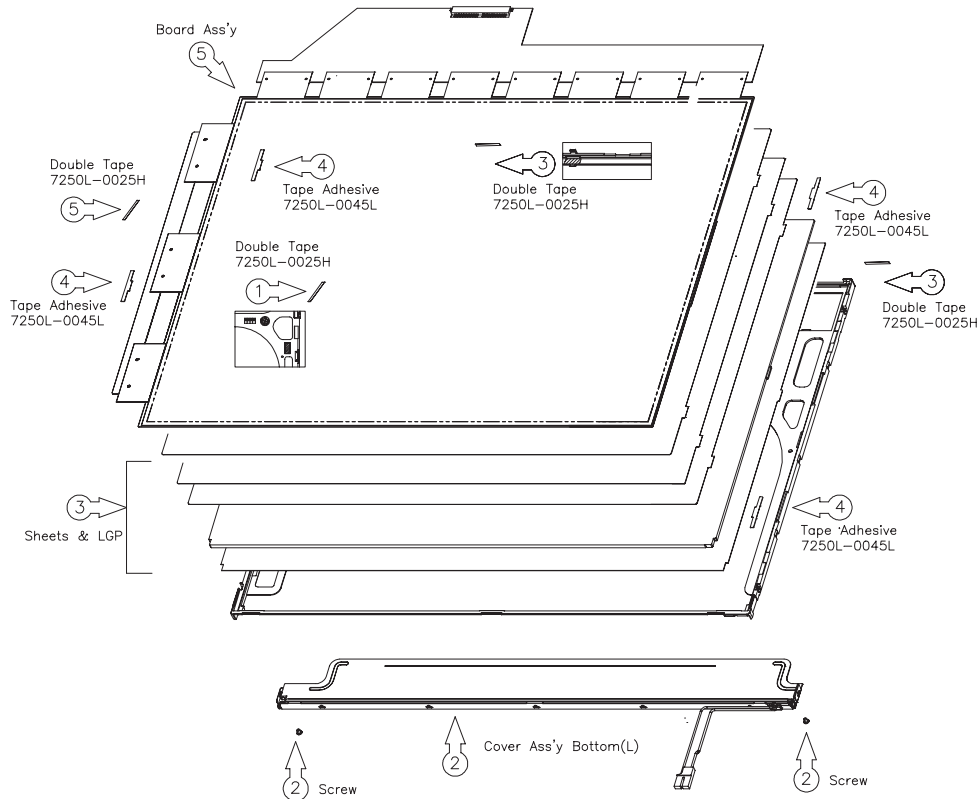


Figure 4-85 Disassembly of Board Ass'y, Tape Adhesive, Light guide, Cover Ass'y bottom(L)

Installing the TFT FL (Model 15.0 XGA LG. Philips LP150X06 A2)

To install the TFT FL (Model 15.0 LG. XGA Philips LP150X06 A2), follow the steps below and refer to Figures 4-86 to 4-89.

1. Detach a protect film from Double Tape at the Cover Ass'y Bottom(L)
2. Assembly of Cover Ass'y bottom(L) and Screw. Maximum value of torque with Screw should be below 2.0kgf.cm
3. Assembly of Light guide and Sheets. (Reflector Sheet fixing with one Double Tapes)
No penetration of foreign body is indispensable with no scratch on the surface of each Sheet and Light guide.
4. Assembly of Tape adhesive used for Sheets fixing
5. Assembly of Board Ass'y. (Gate PCB fixing with Double Tape.) Pressure or stress should not be given on PCB and TCP.

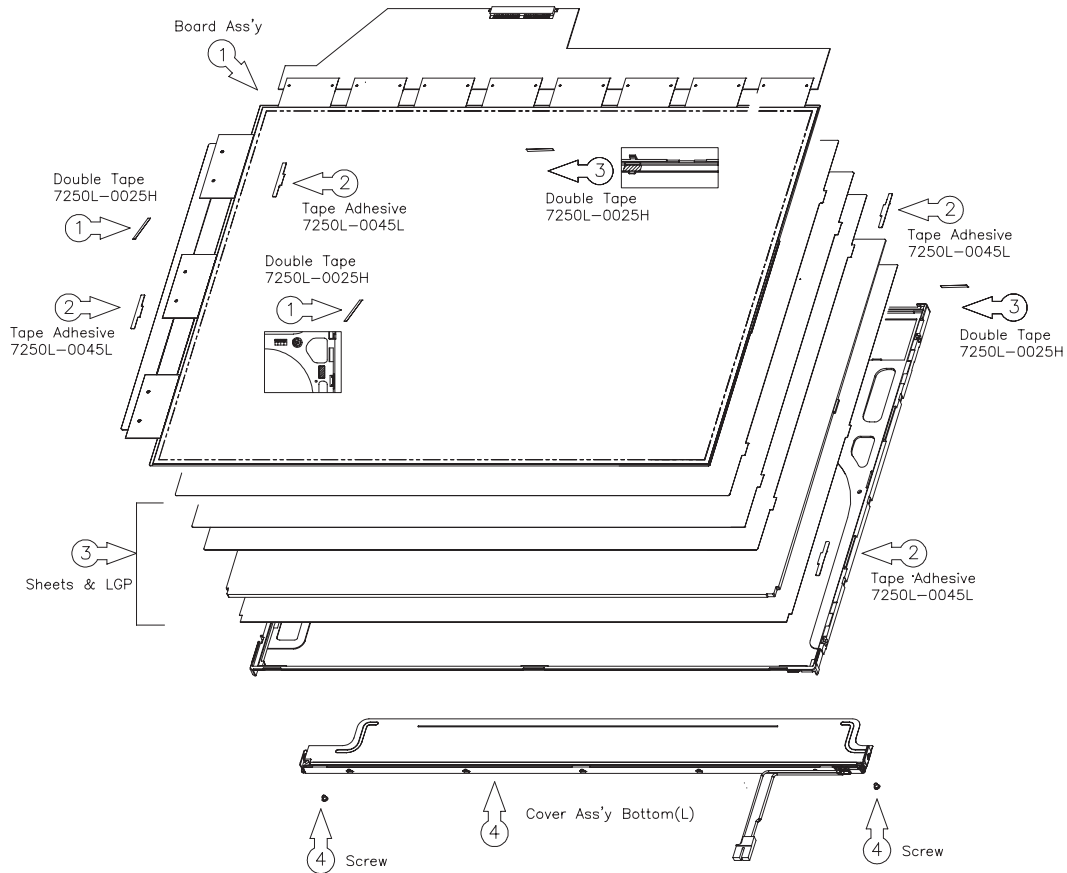


Figure 4-86 Assembly of Cover Ass'y bottom(L), Sheets, Light guide, Tape Adhesive and Board Ass'y

6. Assembly of Source PCB. Stress should not be given on TCP
7. Assembly of Gate PCB. Stress should not be given on TCP

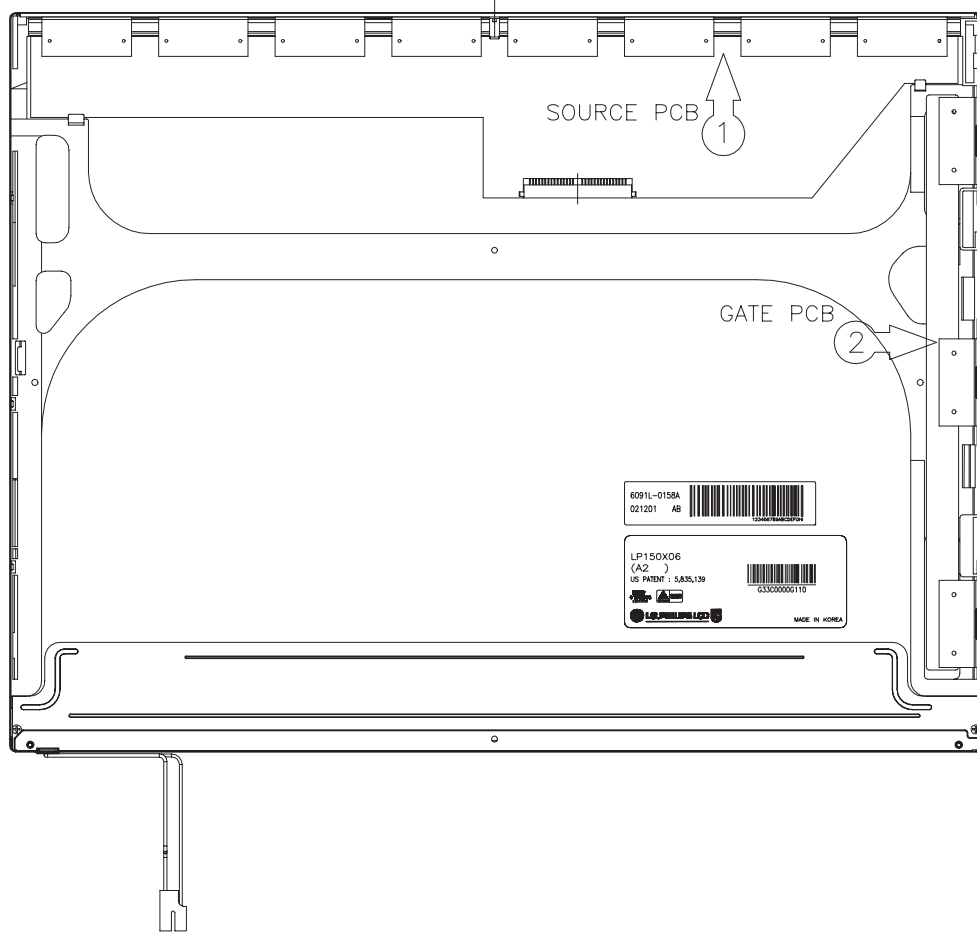


Figure 4-87 Assembly of Source PCB and Gate PCB

8. Assembly of Top Case. Pressure should not be given on Source TCP.

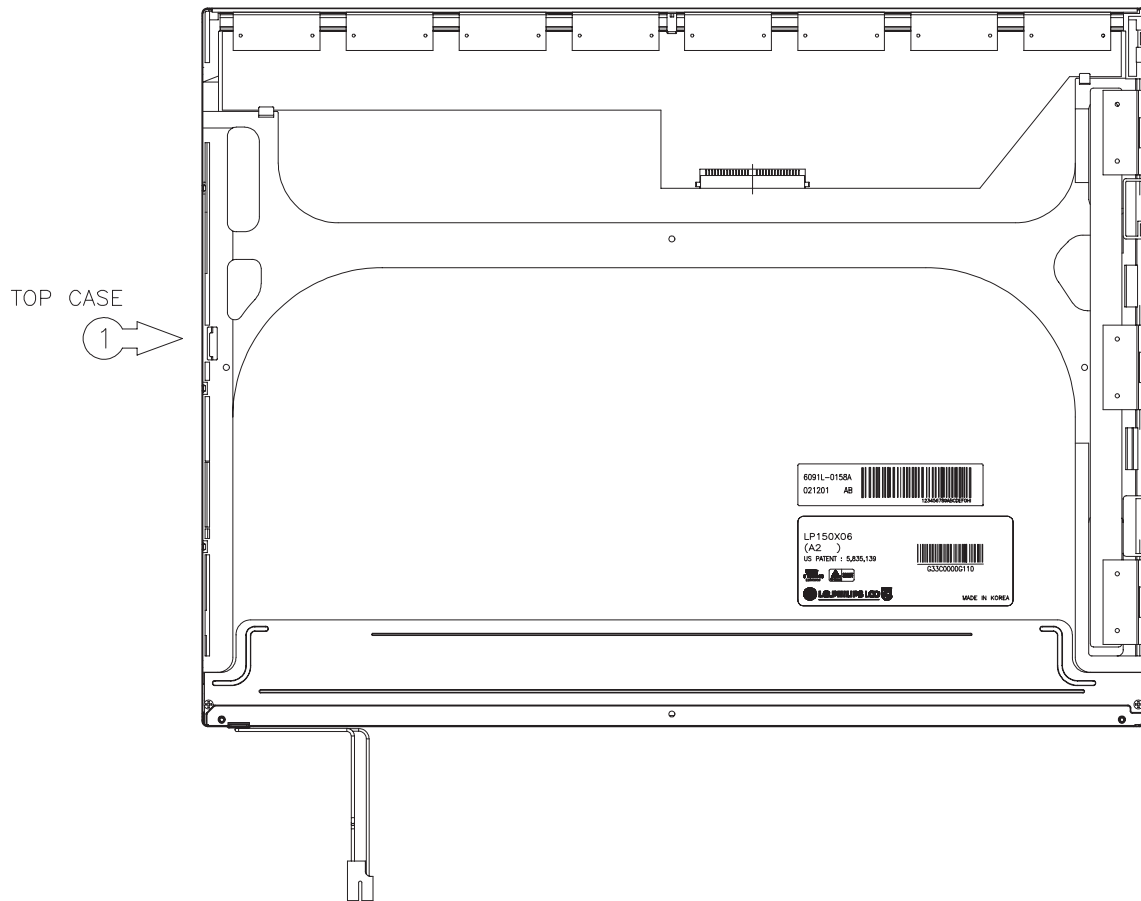


Figure 4-88 Assembly of Cover Ass'y and Top Case

9. Assembly of Tape shield and Tape Adhesive used for Top case fixing. Pressure or stress should not be given on Top case during this process
10. Assembly of Cover shield (C). Pressure or stress should not be given on control PCB. Usage of gloves with anti-electric discharge coating is recommended. To eliminate possible damage on circuits occurred by ESC.
11. Assembly of Cover shield (G). Pressure or stress should not be given on Gate TCP.
12. Assembly of Tape adhesive used for B/L Wire fixing. Pressure or stress should not be given on B/L Wire.

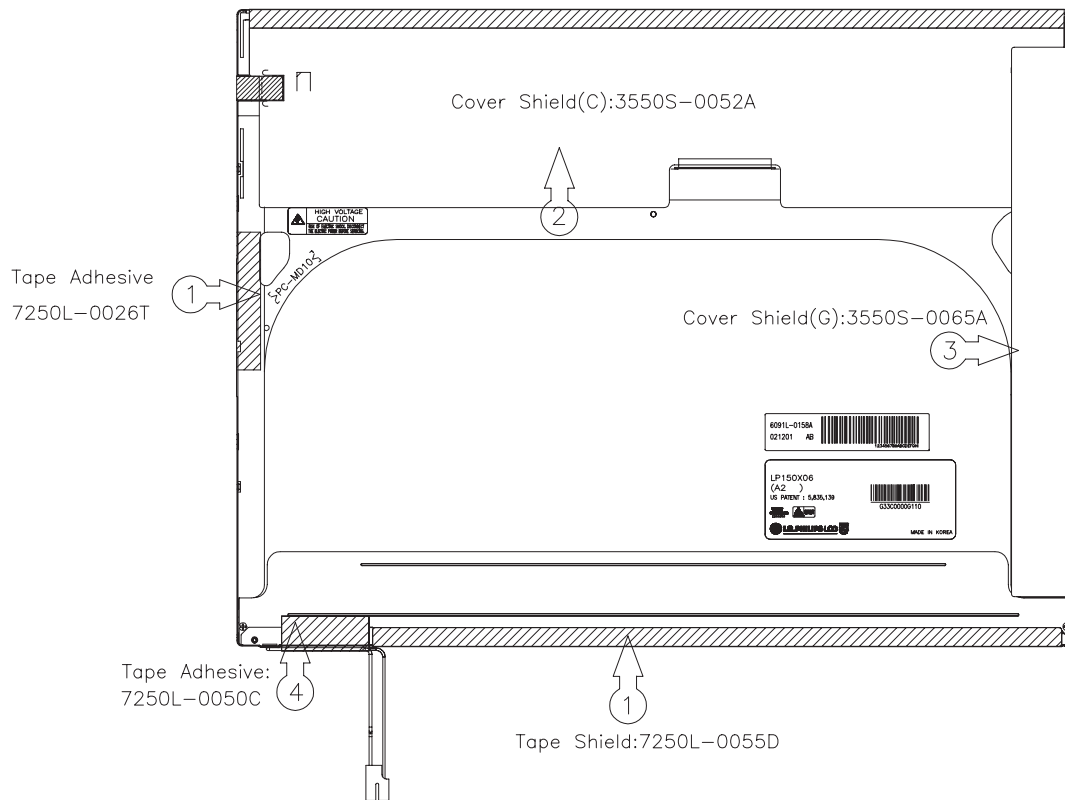


Figure 4-89 Assembly of outside Tape and Cover shield

4.31 TFT FL (Model 15.0 XGA Chi Mei N150X2-L01)

Removing the TFT FL (Model 15.0 XGA Chi Mei N150X2-L01)

To remove the TFT FL (Model 15.0 XGA Chi Mei N150X2-L01), follow the steps below and refer to figures 4-90 to 4-95.

1. Remove the CU tape, yellow tape and protector film_X.

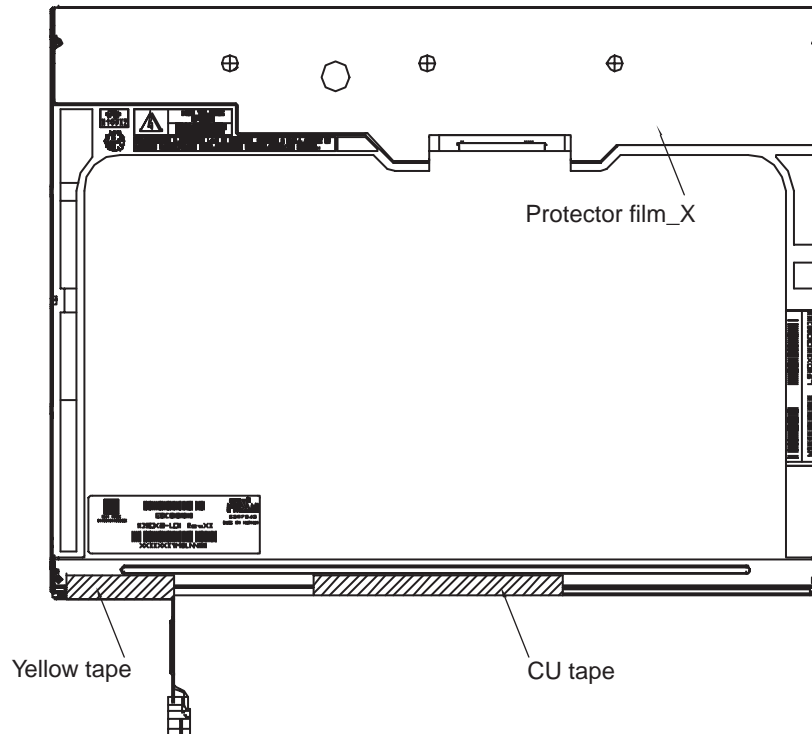


Figure 4-90 Removing the tapes and film

2. Remove two screws securing the X-PCB.
3. Remove eight screws securing the metal frame.
4. Release a hook.

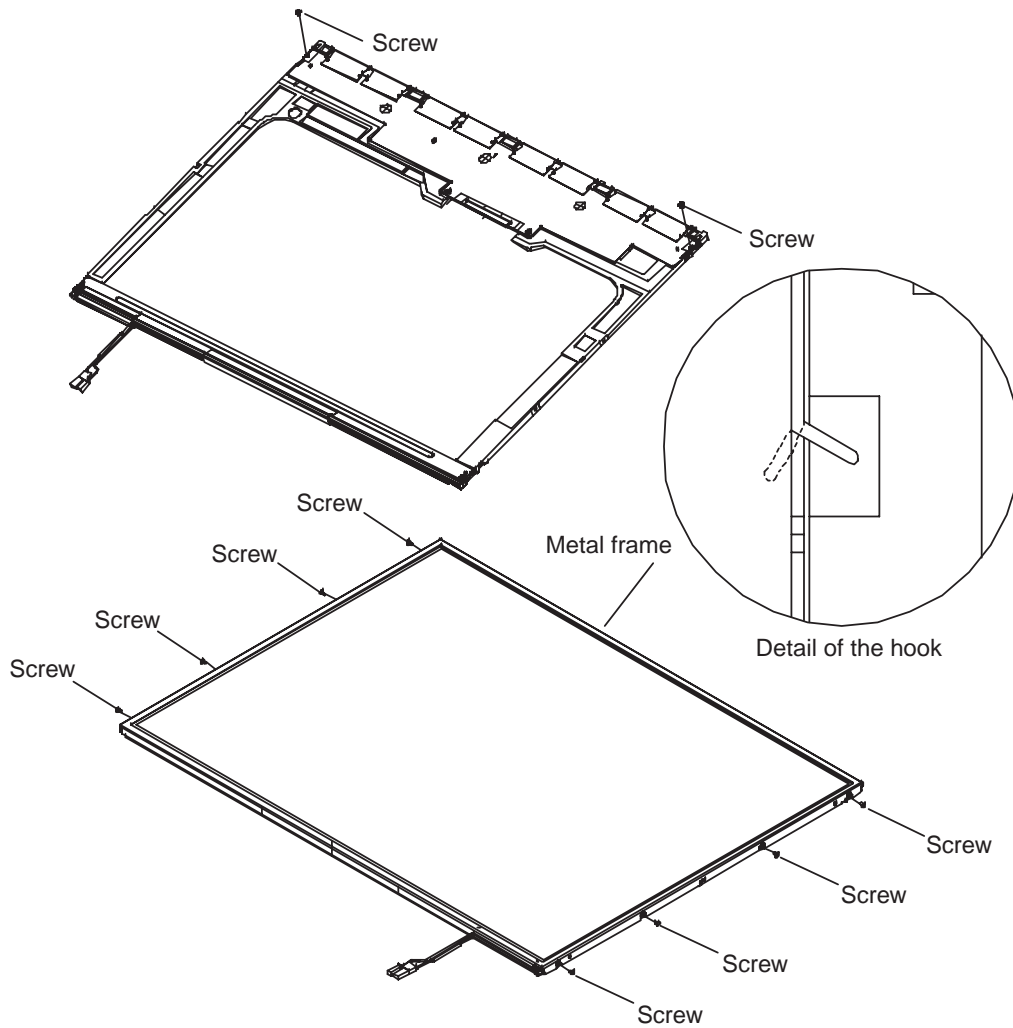


Figure 4-91 Removing the screws securing the X-PCB and metal frame.

5. Push the latch out of lower frame from the lamp holder and then the latch on both sides. Be careful not to distort the frame.

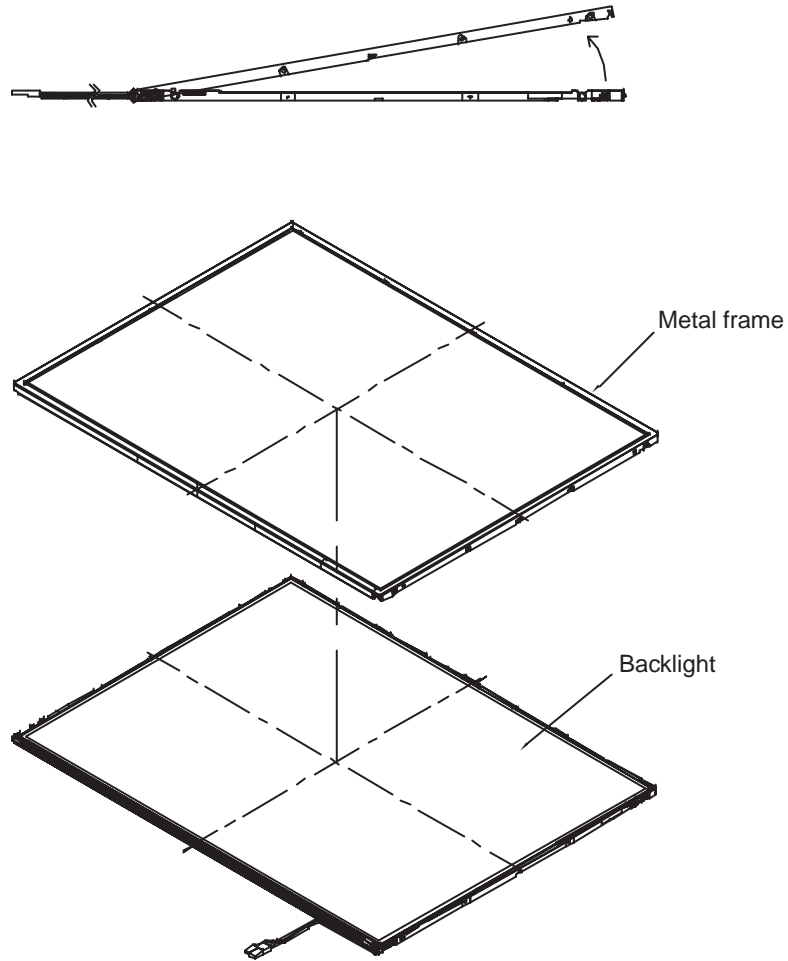


Figure 4-92 Removing the frame

6. Unfold the X-PCB. Be careful not to distort the TCP.
7. Turn the LCD module right side up.
8. Remove the panel.

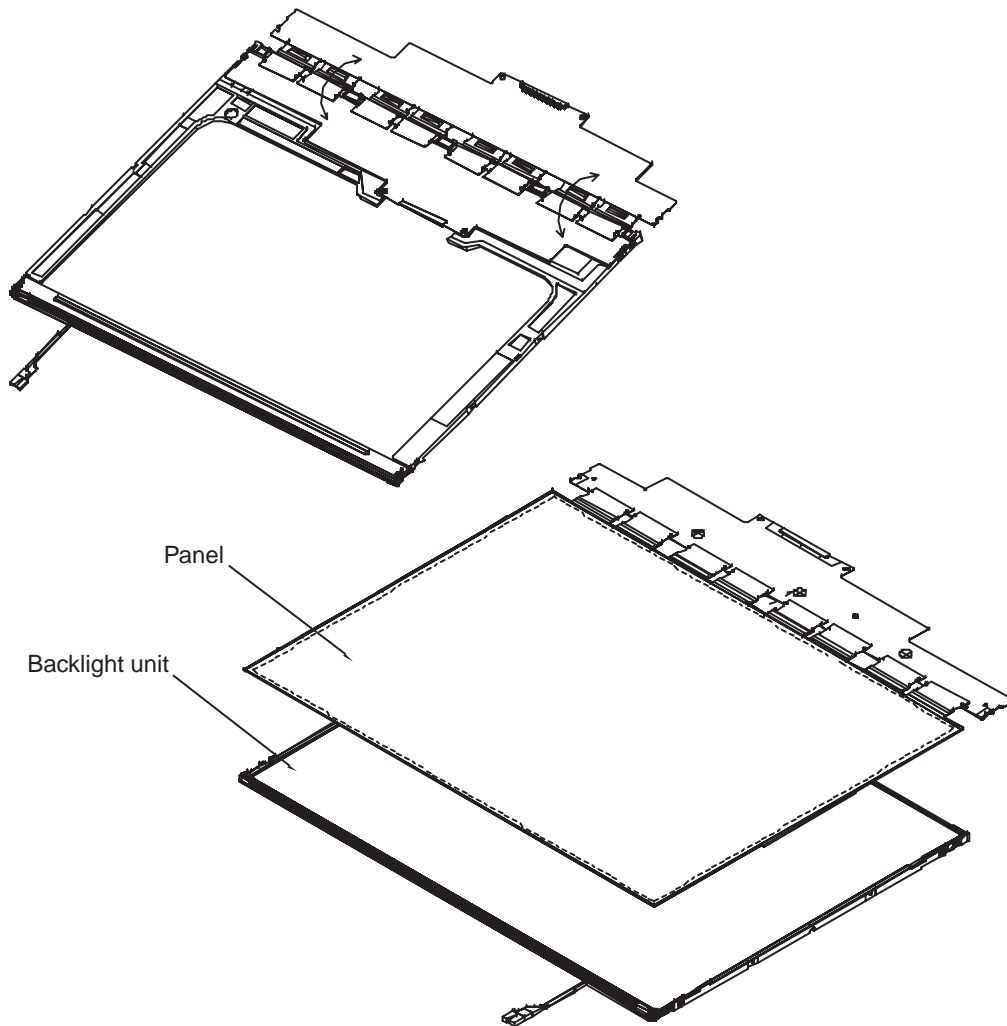


Figure 4-93 Removing the panel

9. Remove three spacers from the BEFIII-M sheet.
10. Remove the BEFIII-M sheet, BEFIII-T sheet, diffuser sheet, and two strips of tape. Be careful not to damage the sheets.

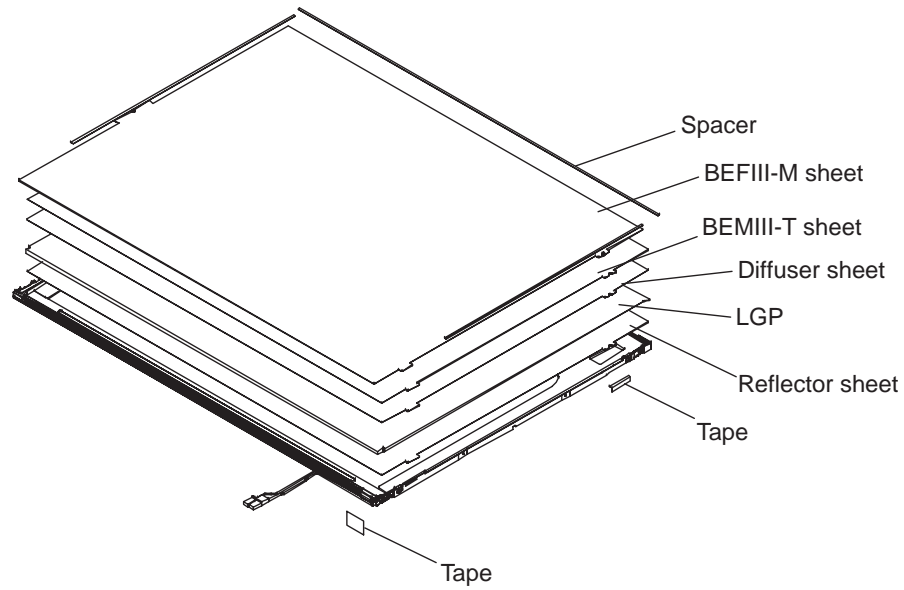


Figure 4-94 Removing the sheets

11. Remove two screws securing the FL.
12. Remove the FL.

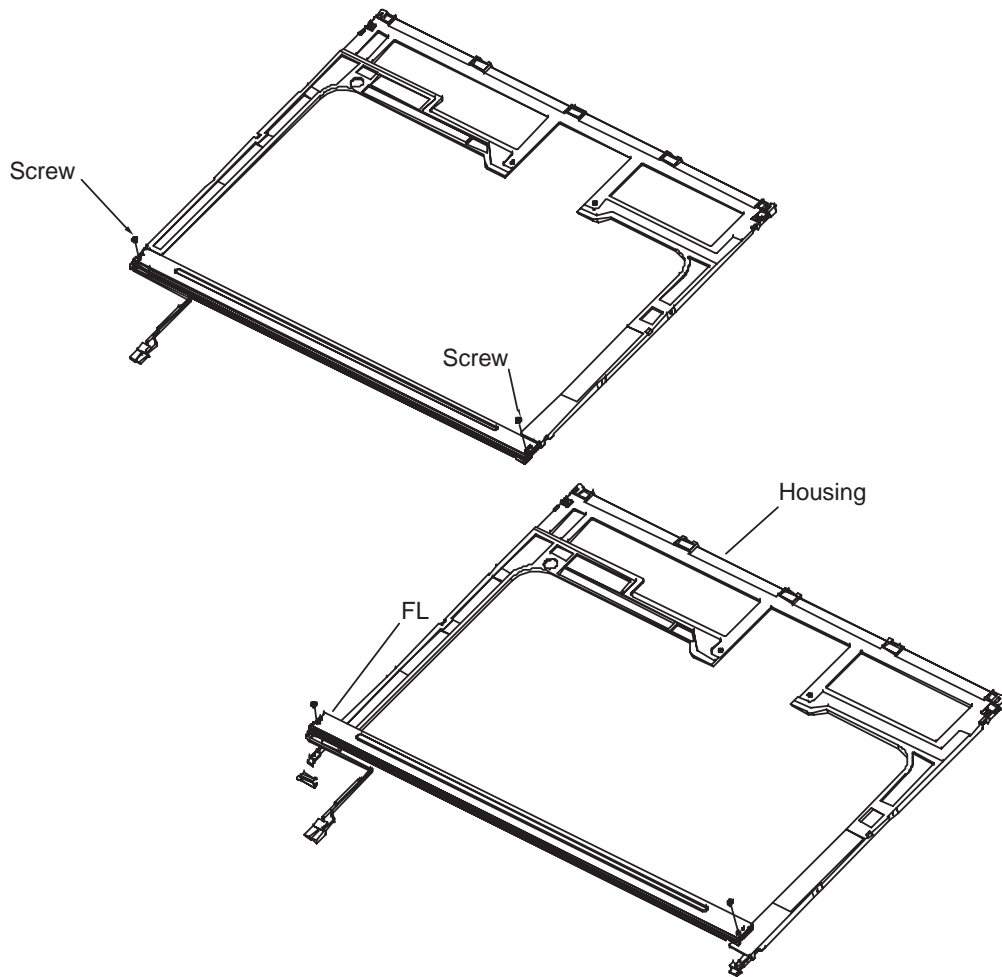


Figure 4-95 Removing the FL

Installing the TFT FL (Model 15.0 XGA Chi Mei N150X2-L01)

To install the TFT FL (Model 15.0 XGA Chi Mei N150X2-L01), follow the steps below and refer to Figures 4-90 to 4-95.

1. Seat the FL and secure it with two screws.
2. Seat the diffuser sheet, BEMIII-T sheet and the BEFIII-M sheet.
3. Apply two strips of tape to the LCD module.
4. Apply three spacers to the BEFIII-M sheet.
5. Seat the panel.
6. Turn the LCD module upside down.
7. Fold the X-PCB.
8. Seat the metal frame and secure it with latches.
9. Secure the metal frame with a hook and eight screws.
10. Secure the X-PCB with two screws.
11. Apply the protector film_X, yellow tape, and CU tape to the LCD module.

4.32 TFT FL (Model 15.0 SXGA+ Samsung LTN150P3-L03)

Removing the TFT FL (Model 15.0 SXGA+ Samsung LTN150P3-L03)

CAUTION: Exercise care during FL removal not to damage the LCD panel and not to let dust or other foreign matter into the LCD panel. Foreign matter is detrimental to the display quality of the LCD.

To remove the TFT FL (Model 15.0 SXGA+ Samsung LTN150P3-L03), follow the steps below and refer to Figures 4-96 to 4-104.

1. Lay the LCD panel face down and remove the **PCB cover**, **Cover-COF** and **aluminum tape** on the back of the LCD.

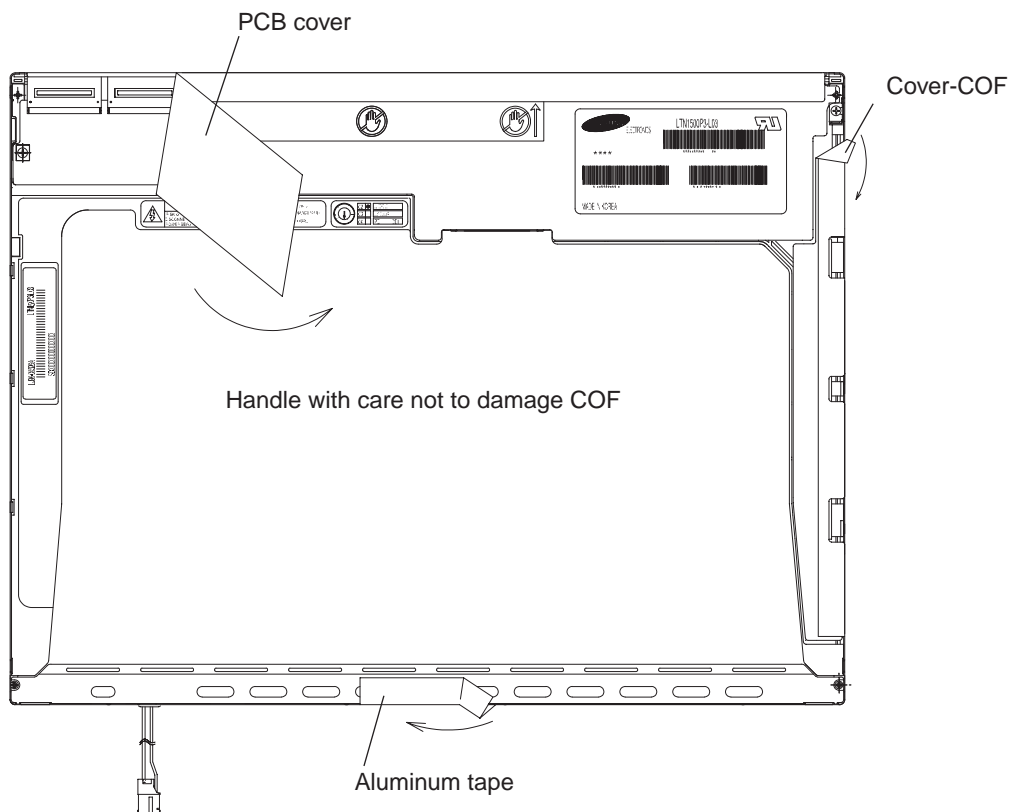


Figure 4-96 Removing the PCB cover

2. Remove **two screws** securing the PCB.

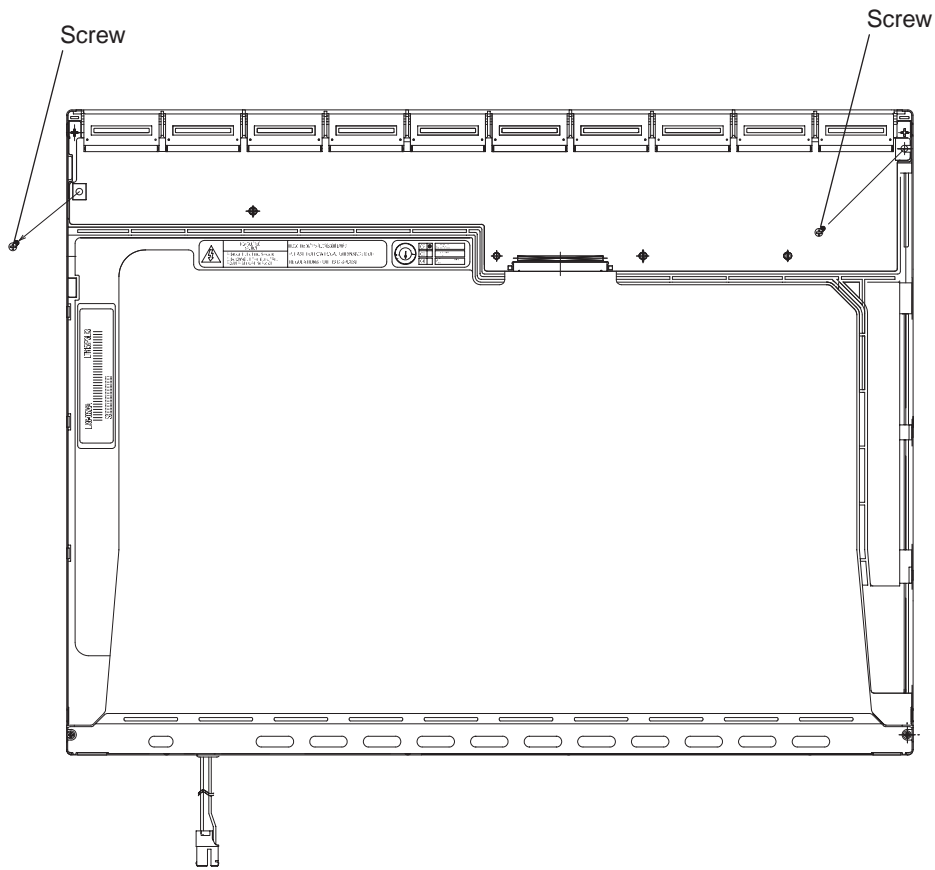


Figure 4-97 Removing the screws securing the PCB

3. Remove **four screws** on the right and left sides of the chassis.

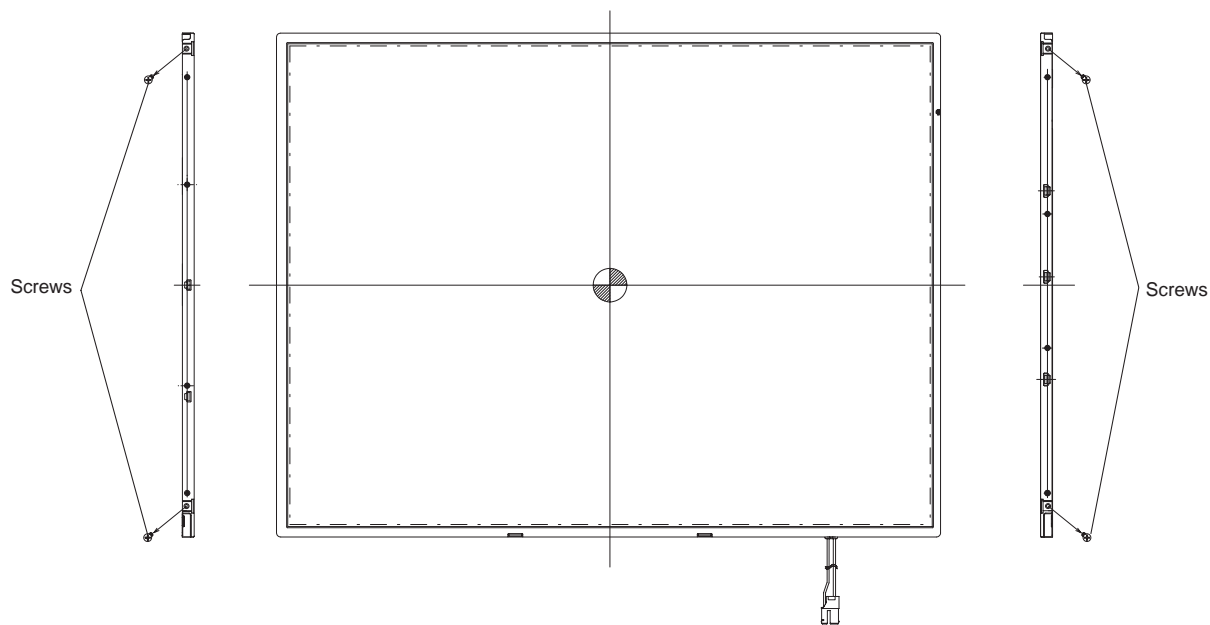


Figure 4-98 Removing screws securing the chassis

4. Release **nine hooks** (four hooks on the bottom side first and five hooks on the right and left side) and remove the top chassis from the LCD module starting from the bottom end.

CAUTION: When you release hooks on the top chassis, be careful not to apply pressure to the FL. The FL can be damaged easily.

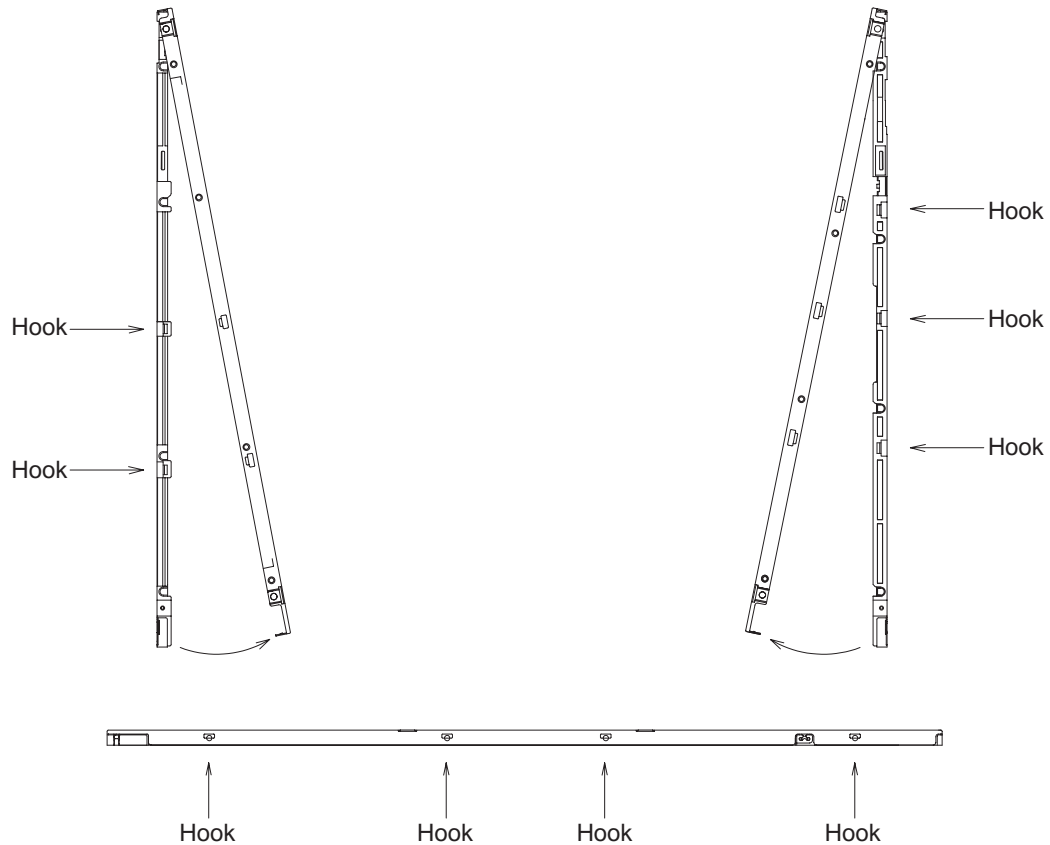


Figure 4-99 Removing the top chassis

5. Turn the LCD module face up and remove the **panel assembly** from the **mold-frame**.

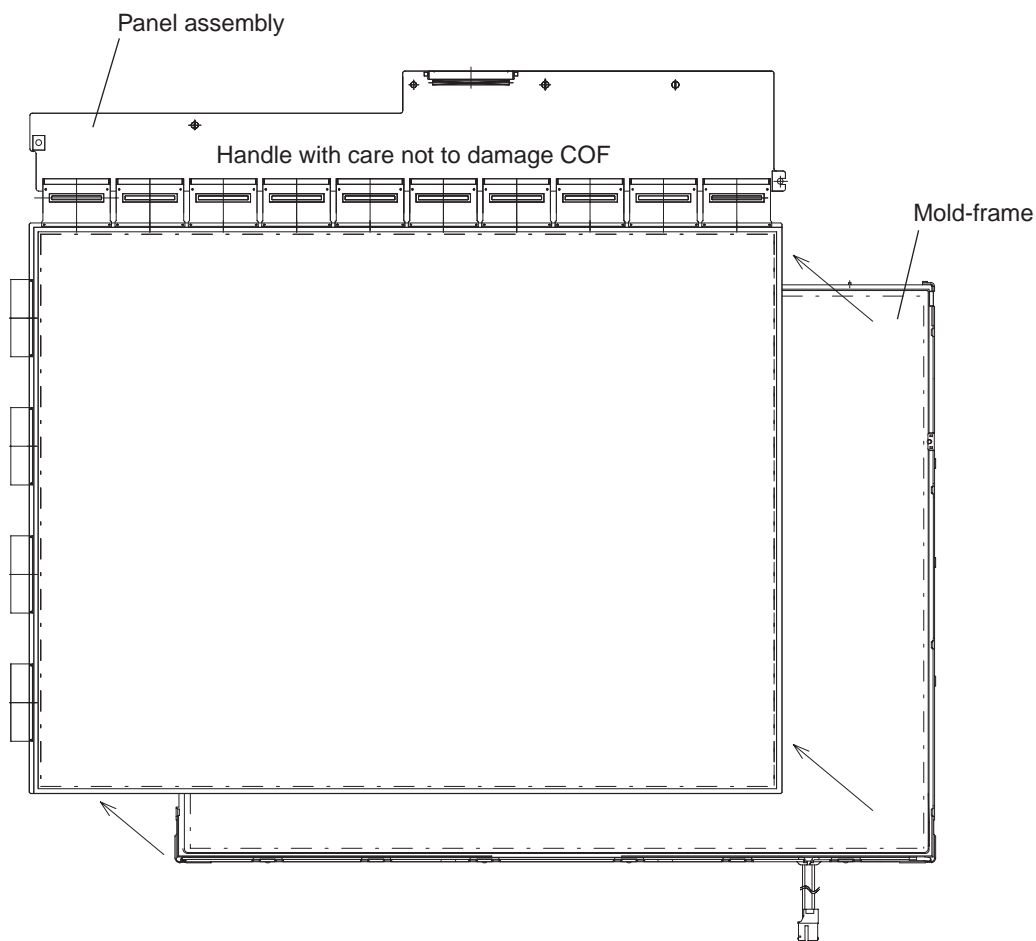


Figure 4-100 Removing the panel assembly

6. Remove **two clips** and **five sheets** (prism(L,U), diffuser, LGP, and reflector sheet) from the back light assembly.

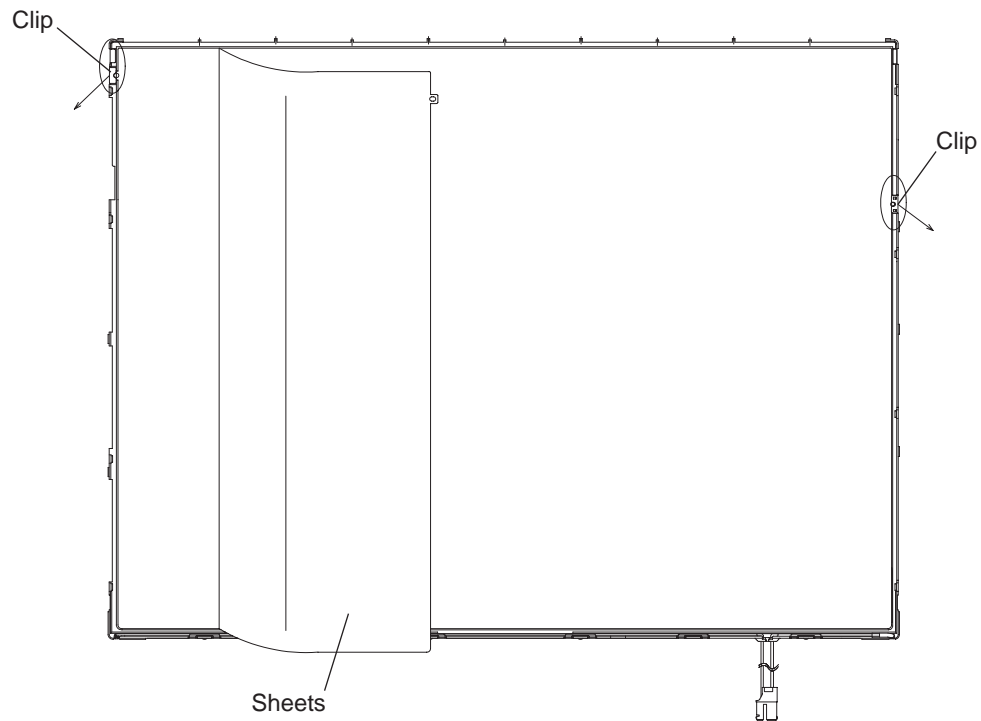


Figure 4-101 Removing one screw, two clips, tape and six sheets

7. Turn the back light assembly face down and remove **two screws** to remove the **lamp cover** from the mold frame.

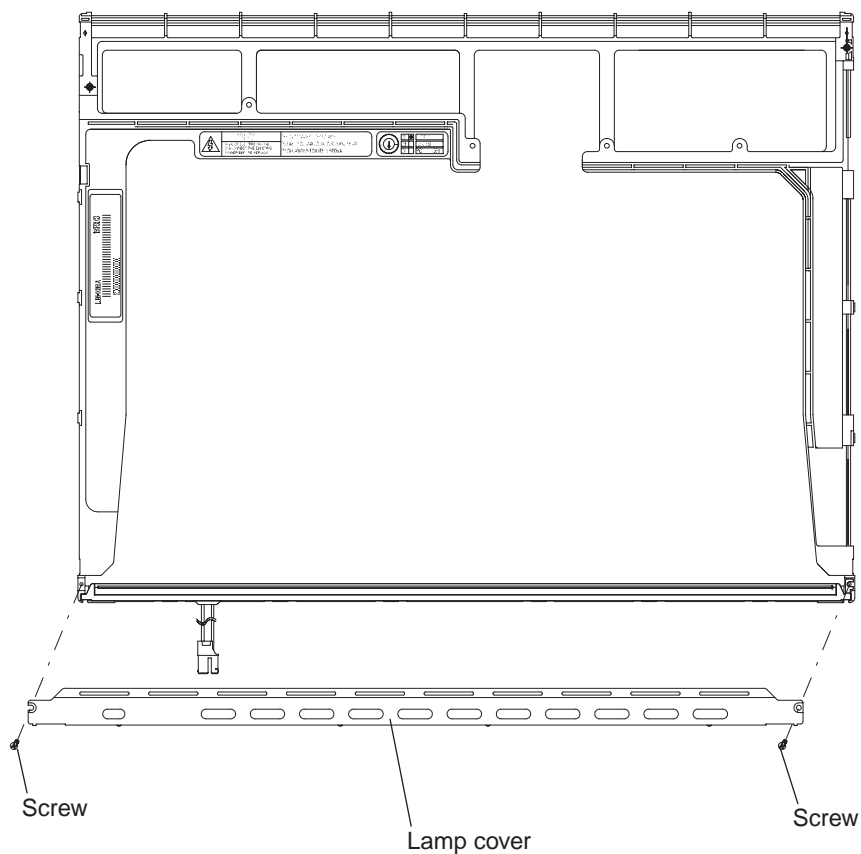


Figure 4-102 Removing the lamp cover

8. Free the **HV cable** from the mold-frame's cable guide.

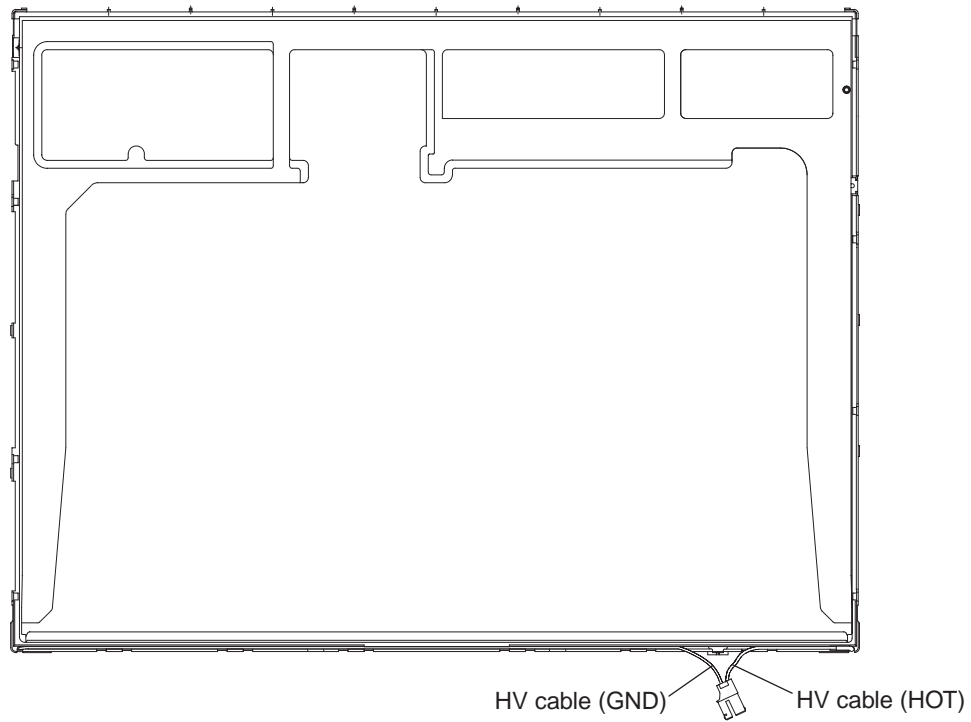


Figure 4-103 Freeing the HV cable

9. Pull the **FL assembly** out of its groove on the mold frame.

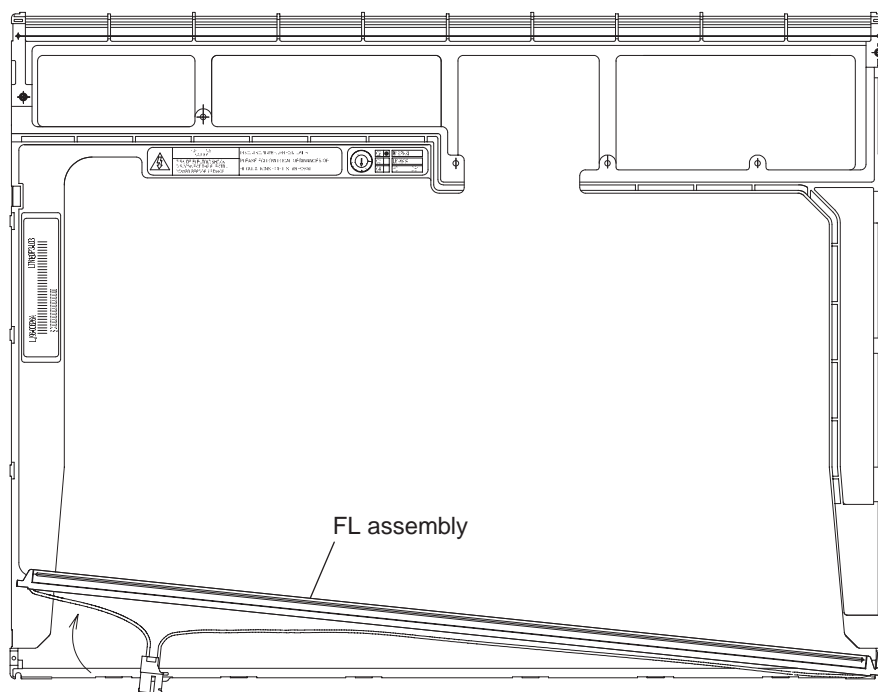


Figure 4-104 Removing the FL assembly

Installing the TFT FL (Model 15.0 SXGA+ Samsung LTN150P3-L03)

To install the TFT FL (Model 15.0 SXGA+ Samsung LTN150P3-L03), follow the steps below and refer to Figures 4-96 to 4-104.

1. Seat the **FL** in its groove on the mold frame.
2. Route the **HV cable** through its guide.
3. Lay the **lamp cover** on the mold frame and secure it with **two screws**.
4. Lay **five sheets** on the back light assembly and secure them with **two clips**.
5. Seat the **panel assembly** on the **back light assembly**.
6. Seat the **top chassis** and secure it with **nine hooks**.
7. Secure the chassis with **four screws**.
8. Secure the PCB with **two screws**.
9. Apply the **PCB cover** and the **aluminum tape** to the module.

4.33 TFT FL (Model 15.0 SXGA+ SHARP LQ150F1LH43)

Removing the TFT FL (Model 15.0 SXGA+ SHARP LQ150F1LH43)

To remove the TFT FL (Model 15.0 SXGA+ SHARP LQ150F1LH43), follow the steps below and refer to Figures 4-105 to 4-113.

1. Turn the LCD module upside down.
2. Remove the protective cover-S, protective cover-G, fixing tape, and HV cable fixing tape. Be careful not to damage the TCP or ICs. (Dispose of the protective covers and tapes you have removed.)

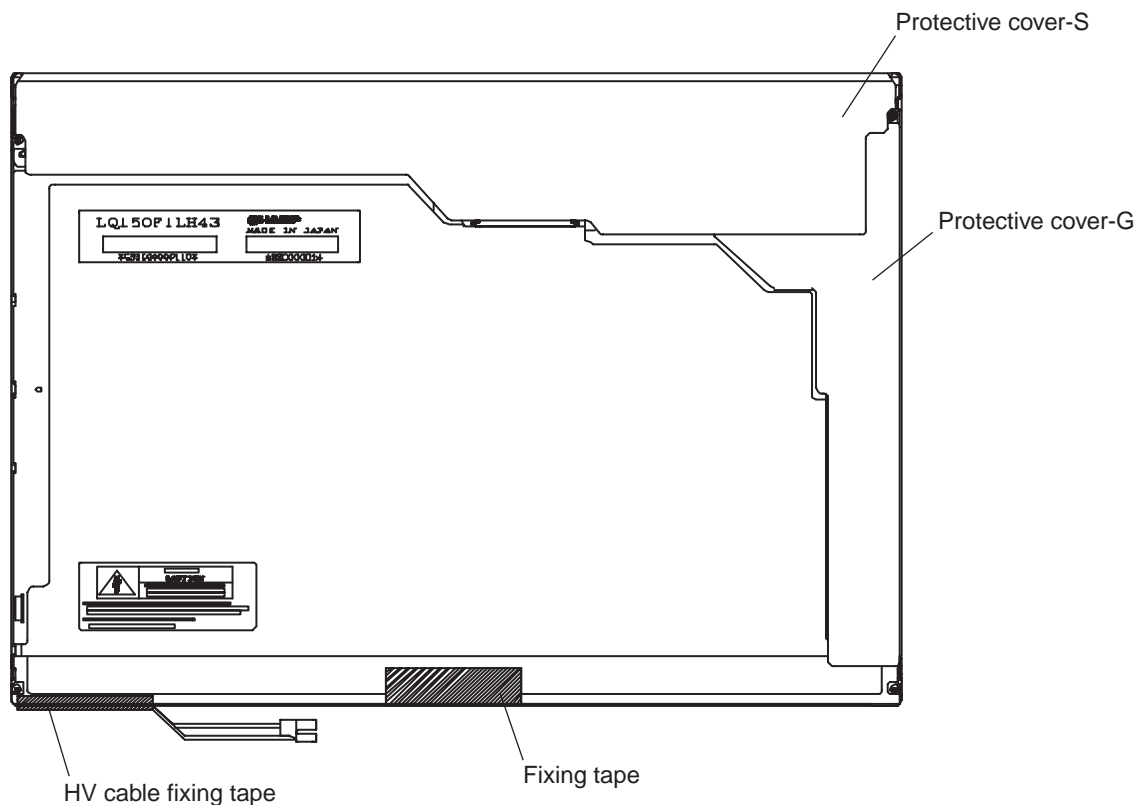


Figure 4-105 Removing the covers and tapes

- Remove four screws from the side of the LCD module.

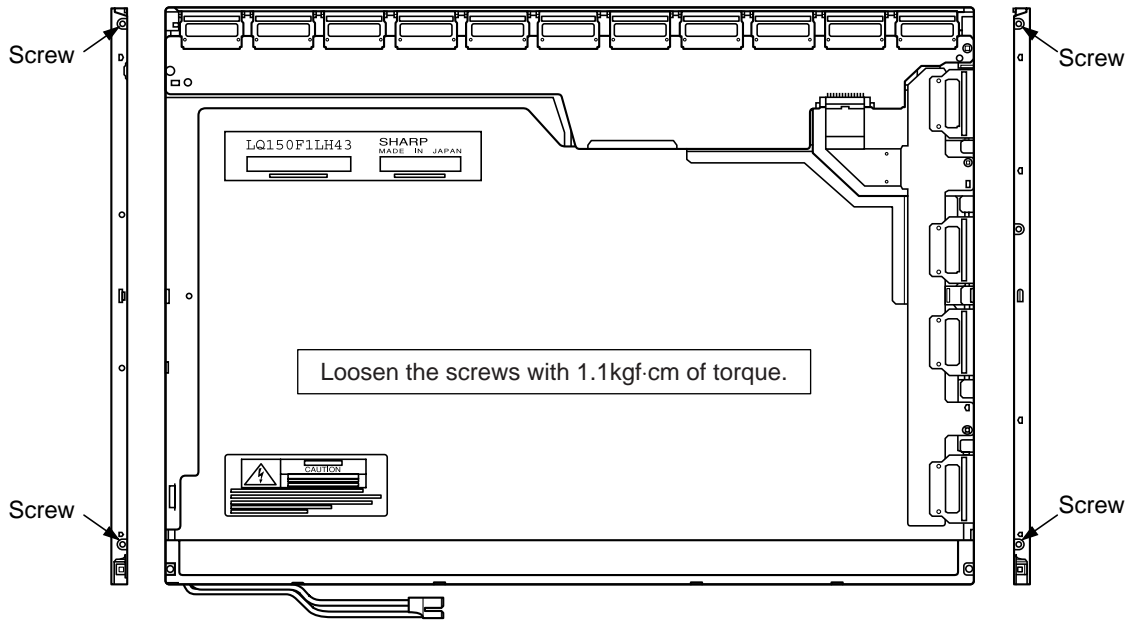


Figure 4-106 Removing the screws

- Turn the LCD module right side up.
- Remove the top frame. When you remove it, wear gloves or finger guards to avoid contaminating or damaging the LCD panel.

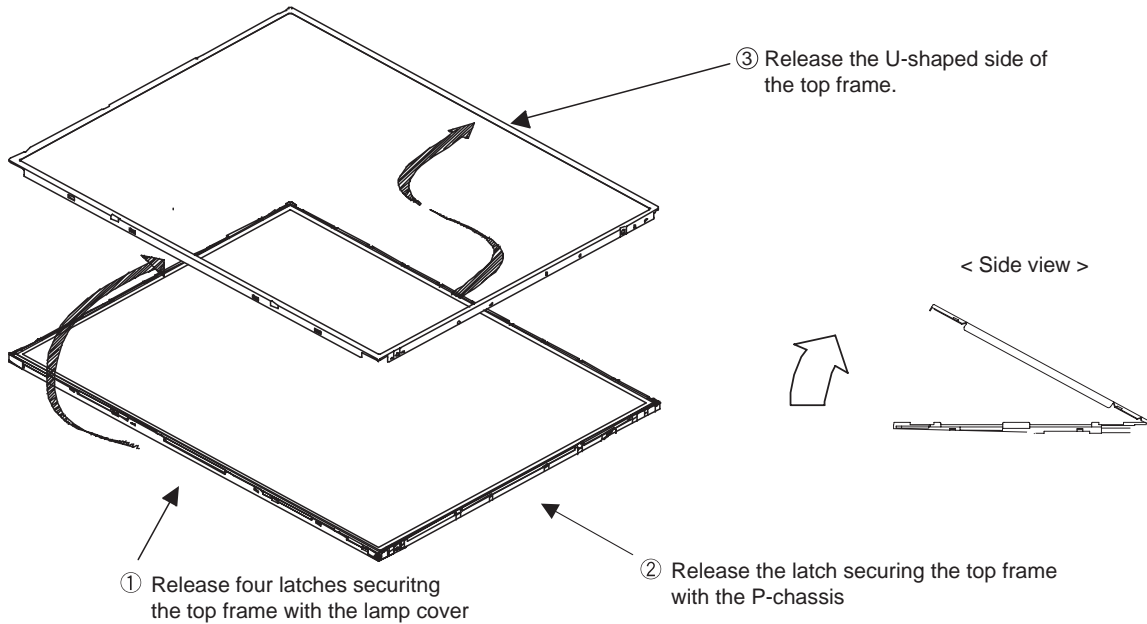


Figure 4-107 Removing the top frame

6. Turn the LCD module upside down.
7. Remove four screws securing the PCBs.
8. Disconnect the FPC.
9. Fold out the PCBs.

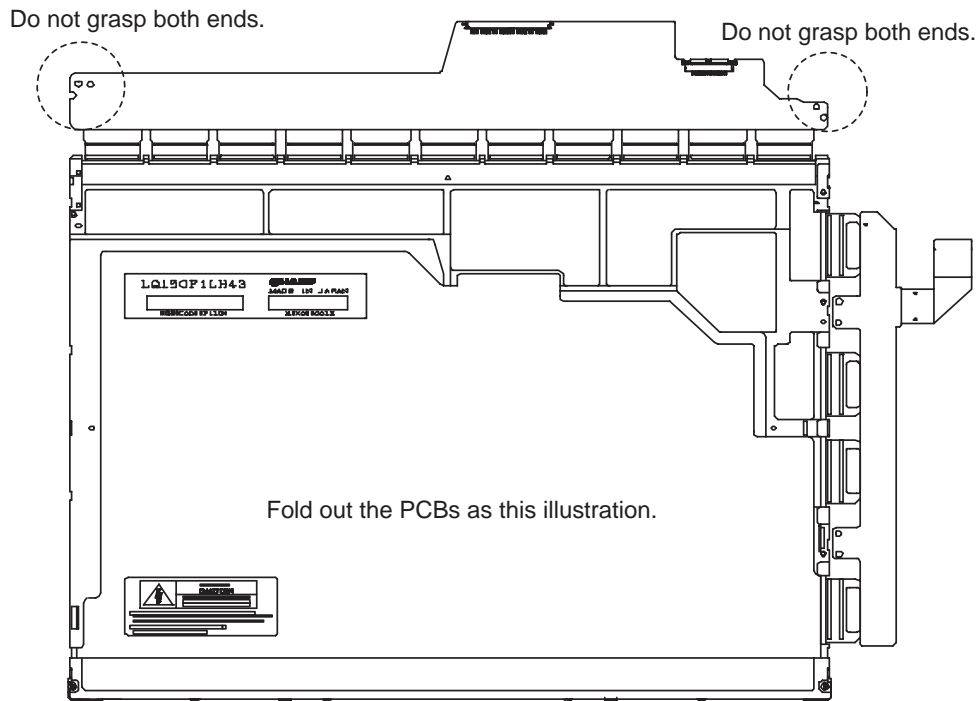
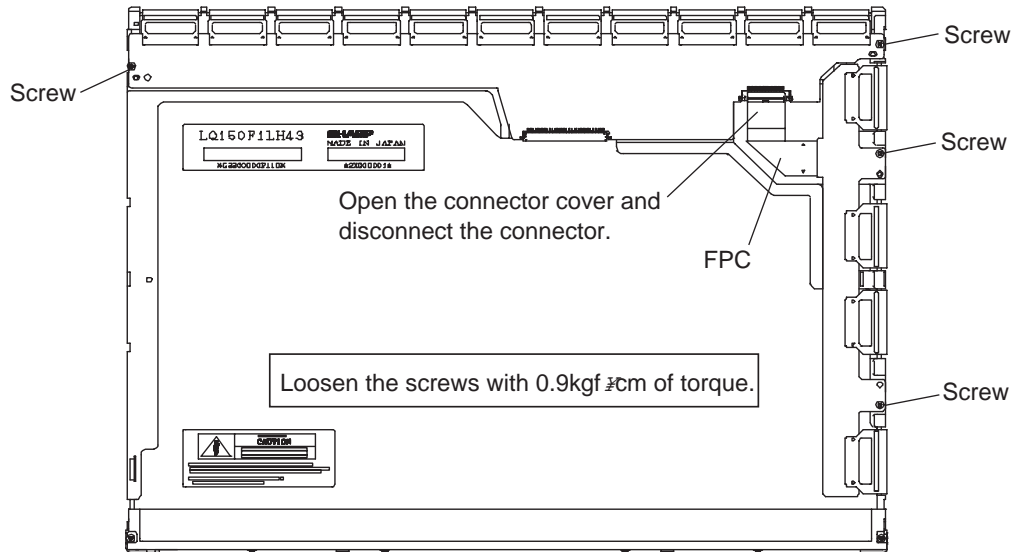


Figure 4-108 Folding out the PCBs

10. Turn the LCD module right side up.
11. Remove the LCD panel from the backlight unit. When you remove the LCD panel, wear finger covers or gloves to avoid contaminating or damaging the LCD panel and the backlight unit.

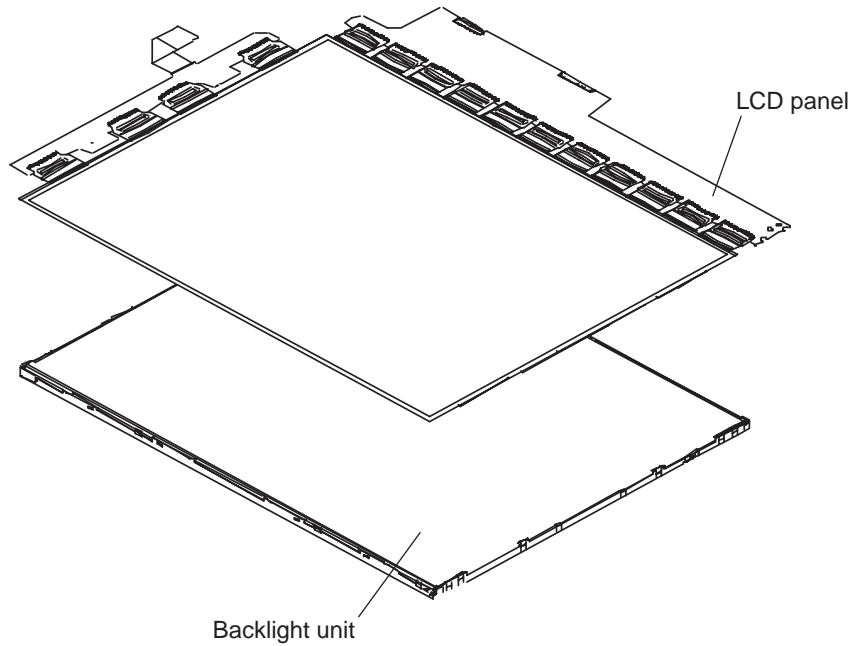


Figure 4-109 Removing the LCD panel

12. Turn the backlight unit upside down taking care not to damage or contaminate the sheets.
13. Remove two screws securing the lamp cover to remove it.

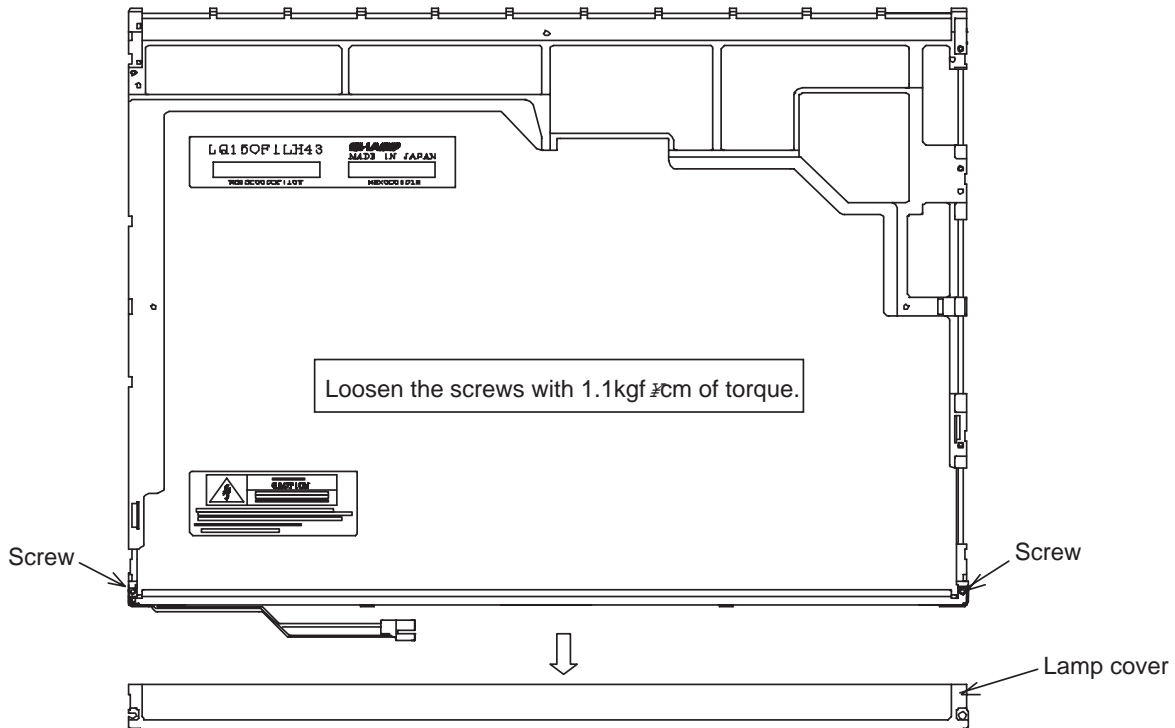


Figure 4-110 Removing the lamp cover

14. Turn the backlight unit right side up.
15. Remove the upper diffuser sheet, lens sheet, and light guide sheet. Be careful not to damage or contaminate the sheets because they are reused.

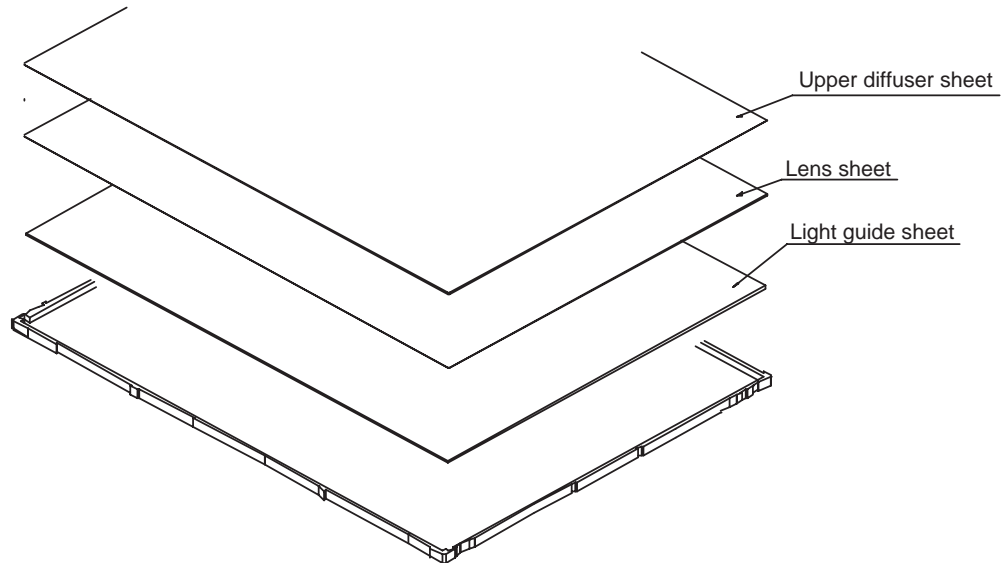


Figure 4-111 Removing the sheets

16. Remove four strips of double-faced tape, and dispose of them.

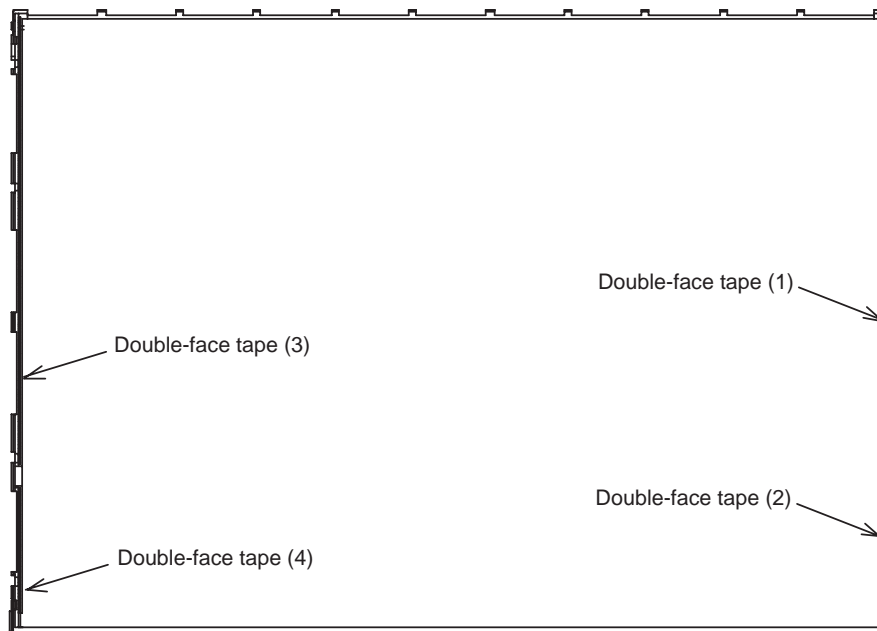


Figure 4-112 Removing the double-faced tape

17. Turn the backlight unit upside down.
18. Gently remove the FL taking care not to damage it.

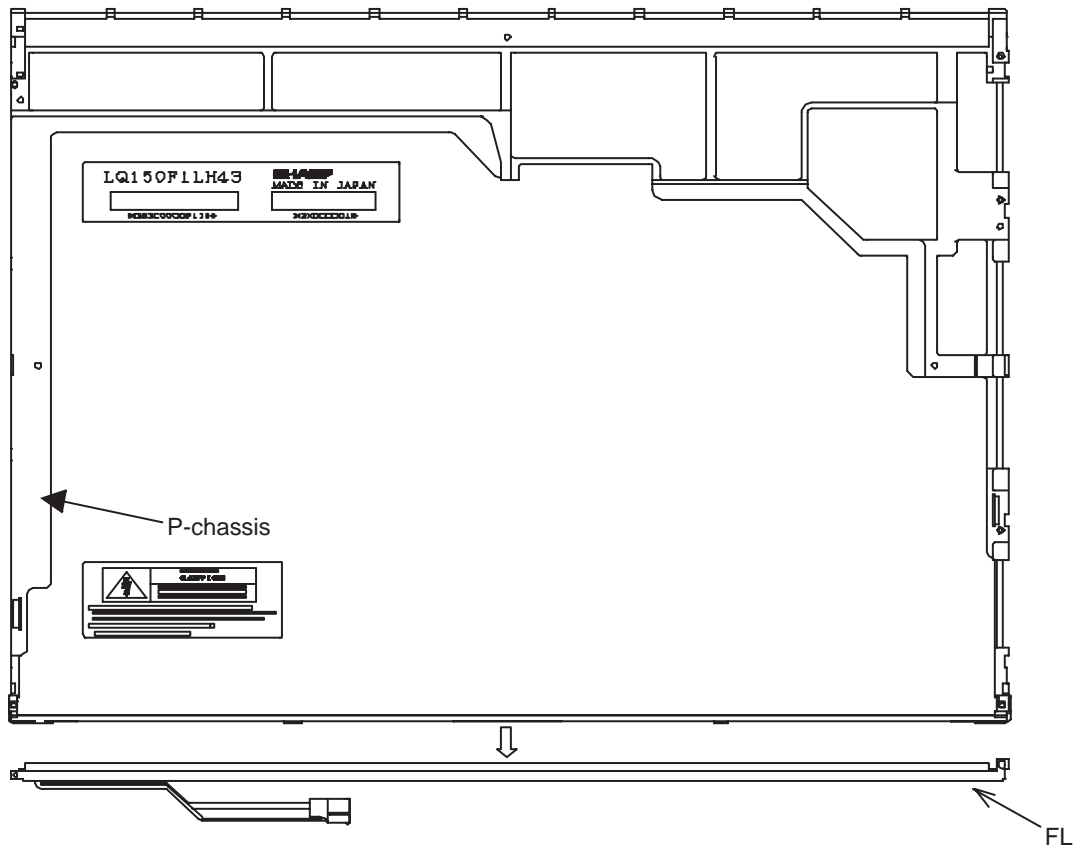


Figure 4-113 Removing the FL

NOTE: Be careful not to fold the reflective sheet back when you remove the FL assembly.

Installing the TFT FL (Model 15.0 SXGA+ SHARP LQ150F1LH43)

To install the TFT FL (Model 15.0 SXGA+ SHARP LQ150F1LH43), follow the steps below and refer to Figures 4-114 to 4-126.

1. Apply four strips of double-faced tape to the frame.

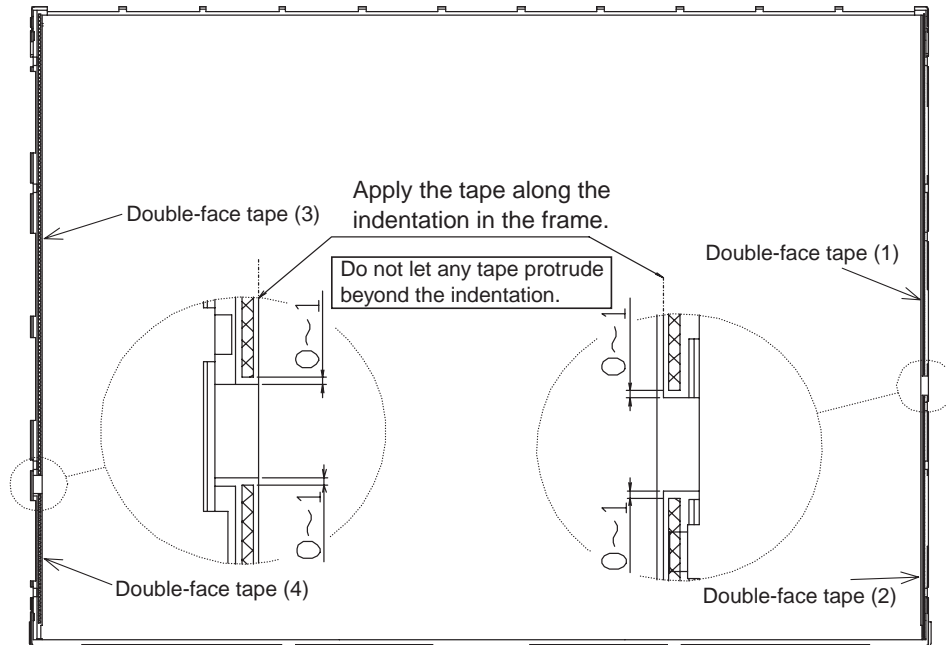


Figure 4-114 Applying the double-faced tape

2. Install a new FL unit into the frame.

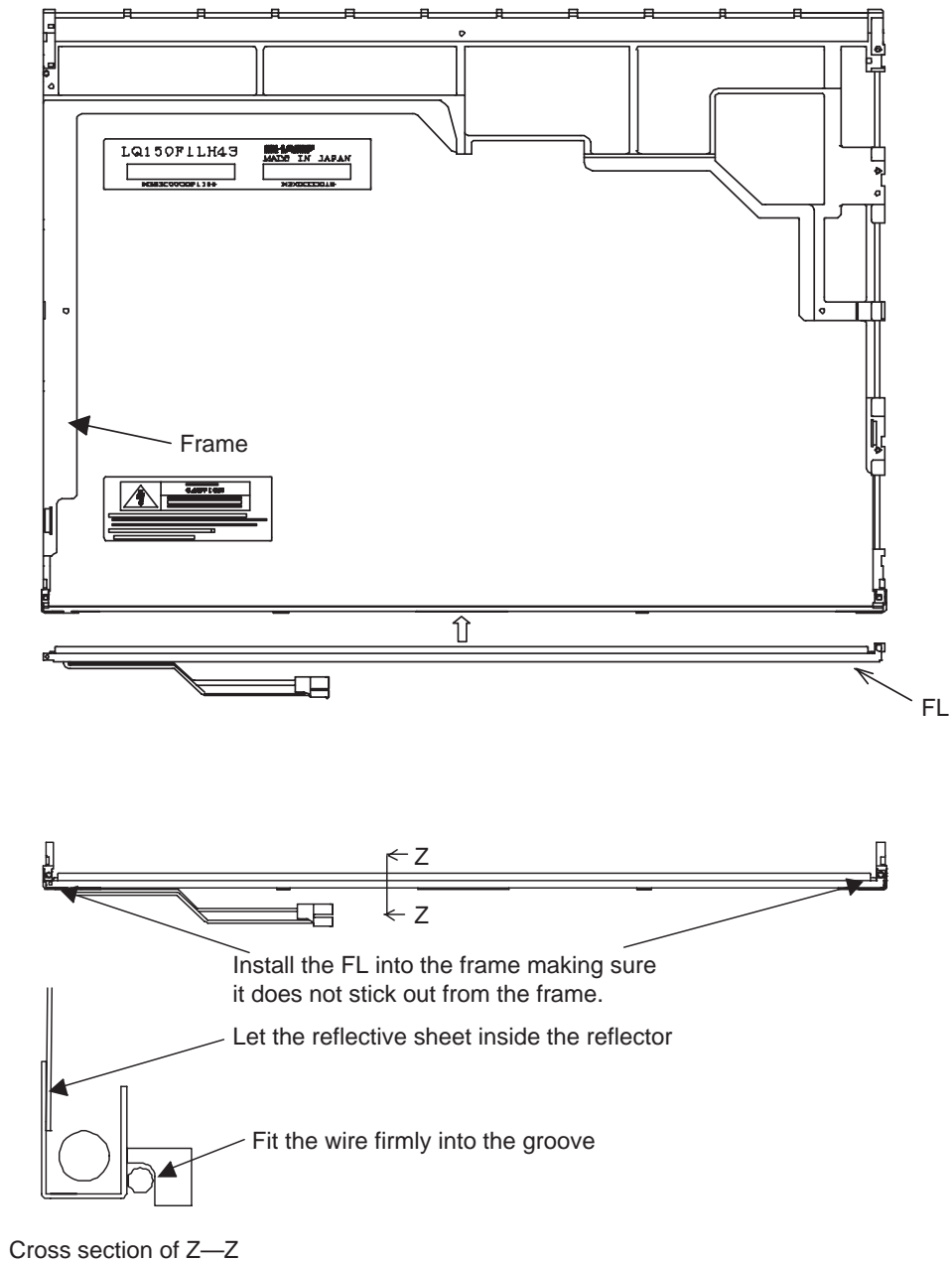


Figure 4-115 Installing the FL

NOTE: Be careful not to fold the reflective sheet when you install the FL unit.

3. Seat the lamp cover on the backlight unit and secure it with two screws.

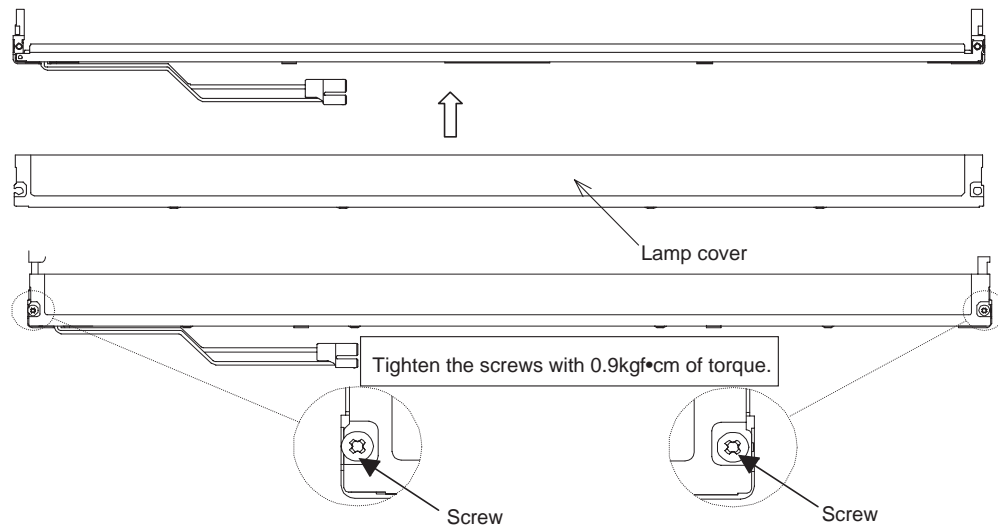


Figure 4-116 Installing the lamp cover

4. Install the light guide sheet in the backlight unit.

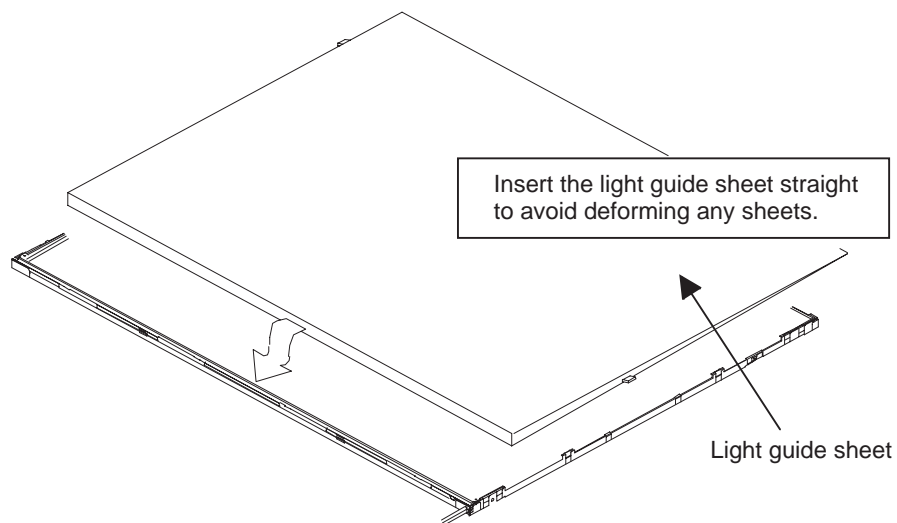
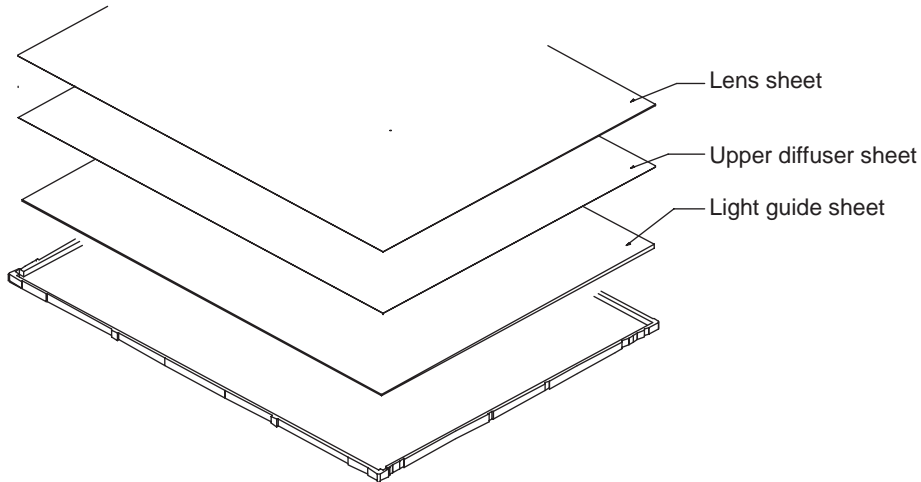


Figure 4-117 Installing the light guide sheet

5. Strip all of the liner on the double-faced tape applied to the frame.
6. Lay the lens sheet and upper diffuser sheet on the backlight unit. Be careful not to contaminate or damage any sheets.



Be careful not to contaminate or damage any sheets.

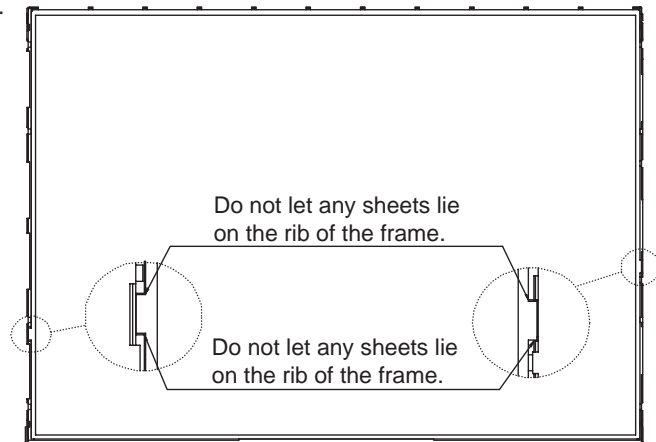


Figure 4-118 Installing the sheets

7. Seat the LCD panel on the backlight unit assembled by the steps above. Make sure there are no dust between the LCD panel and the backlight. If you find any foreign matter, remove it.
8. Make sure the LCD panel fits into the panel guide ribs.

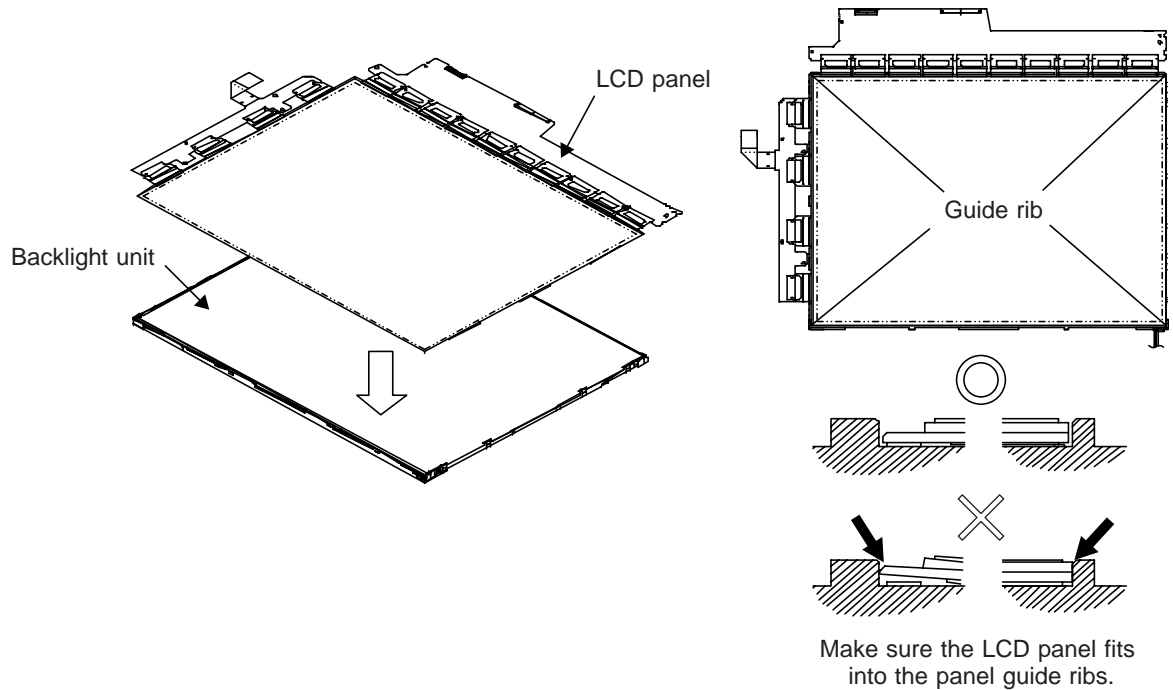


Figure 4-119 Installing the LCD panel

9. Fold the TCP of the source PCB down.
10. Secure the source PCB with two screws.
11. Fold the TCP of the gate PCB down.
12. Secure the gate PCB with two screws.

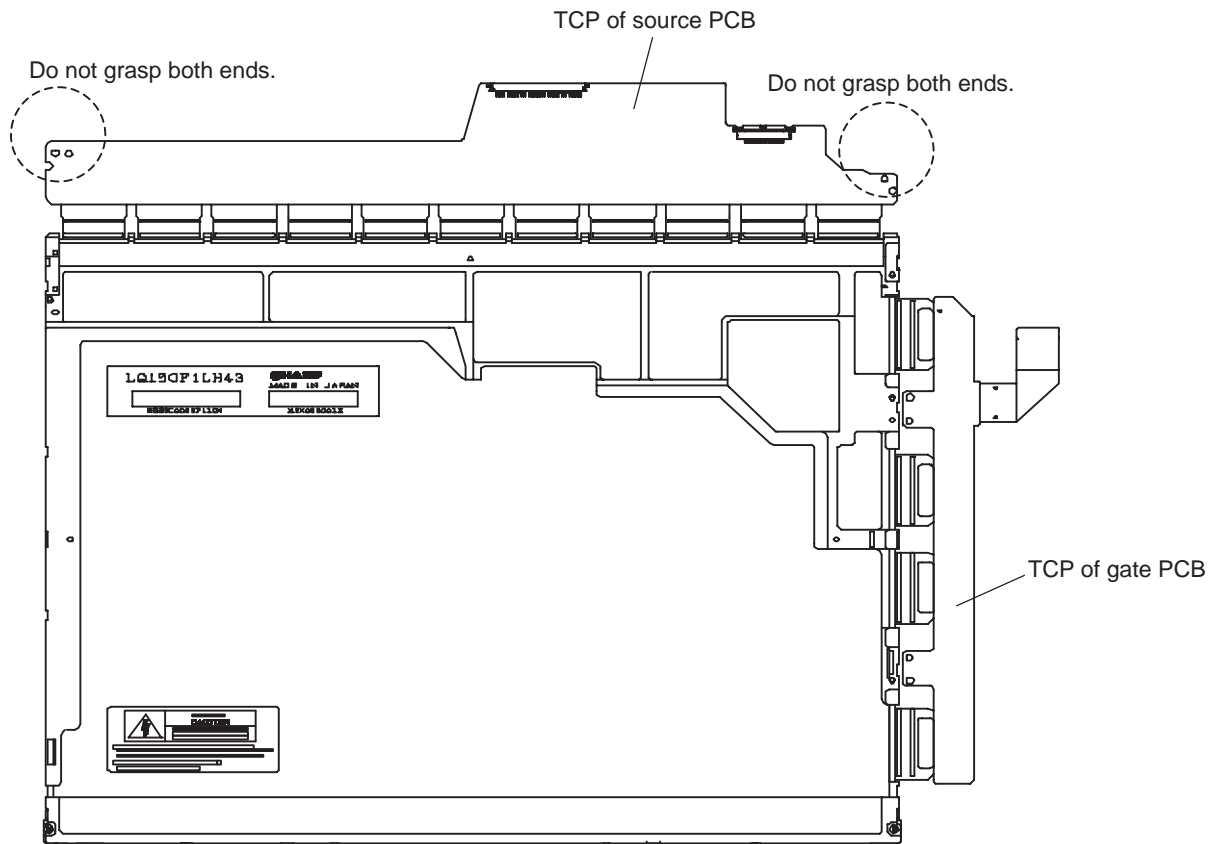
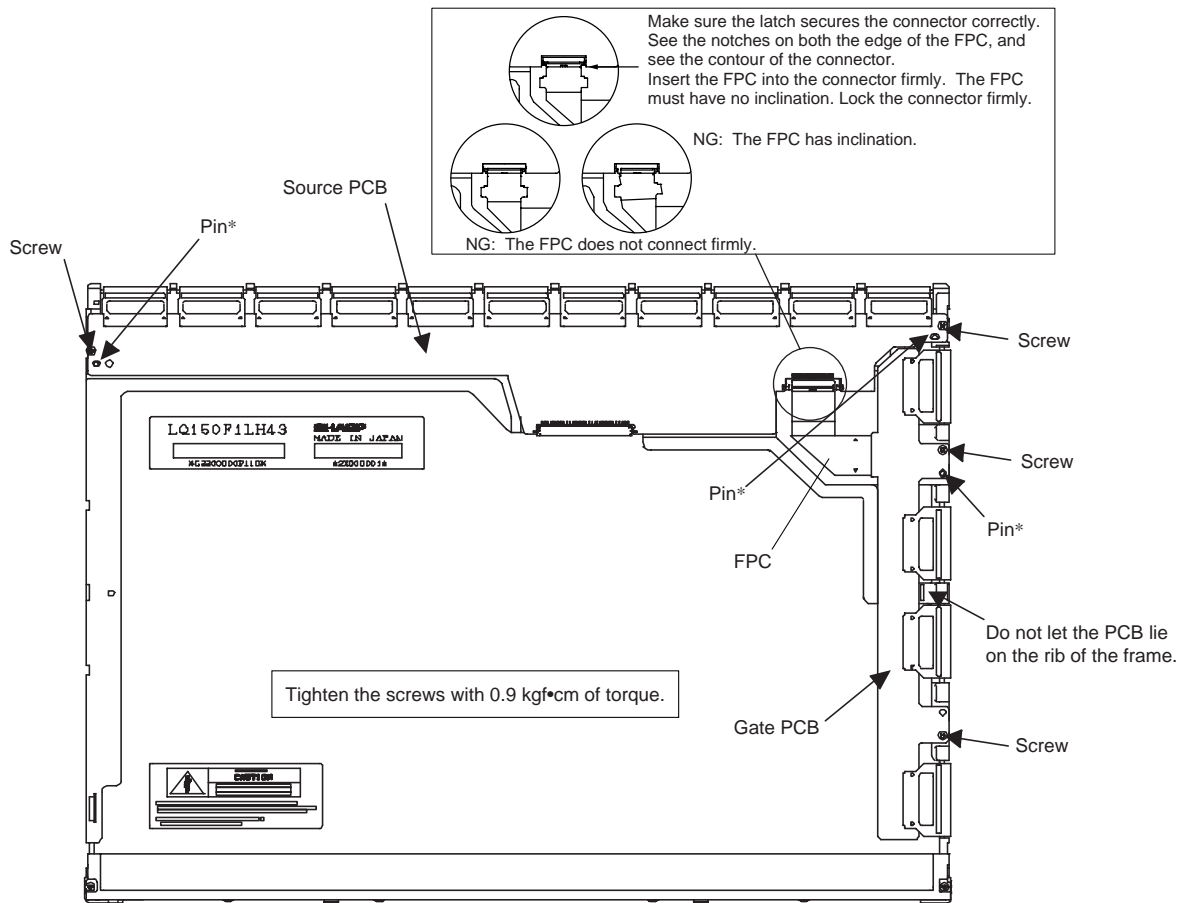


Figure 4-120 Folding down the PCBs

13. Connect the FPC to the connector on the source PCB.



* Align the holes on the PCBs with the pins.

Figure 4-121 Securing the PCBs and connecting the FPC

14. Install the top frame. Secure the top frame and the lamp cover with six latches.

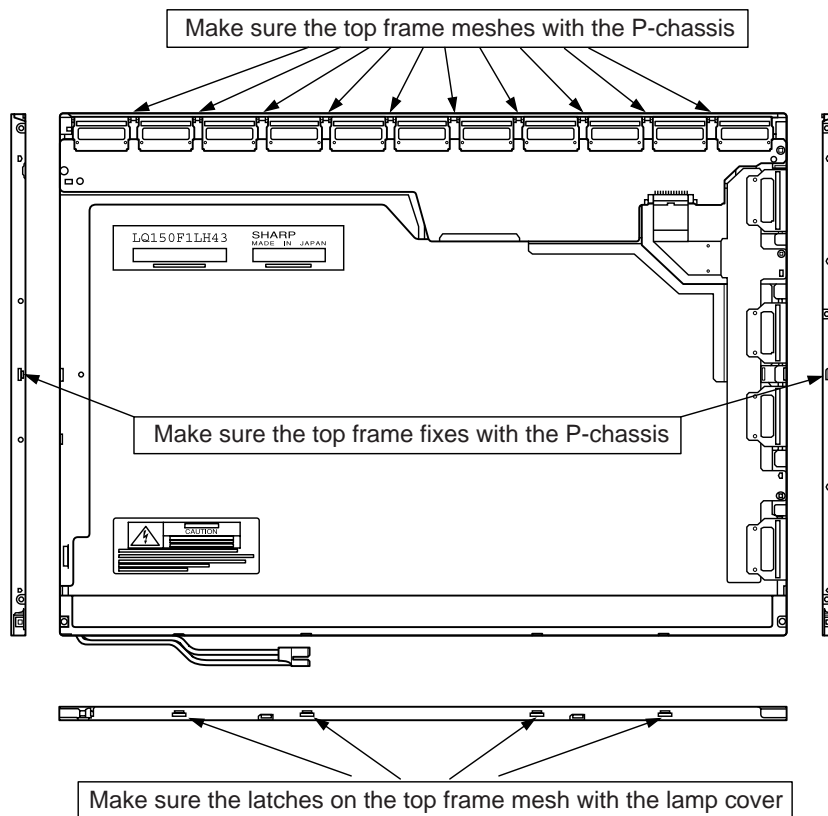
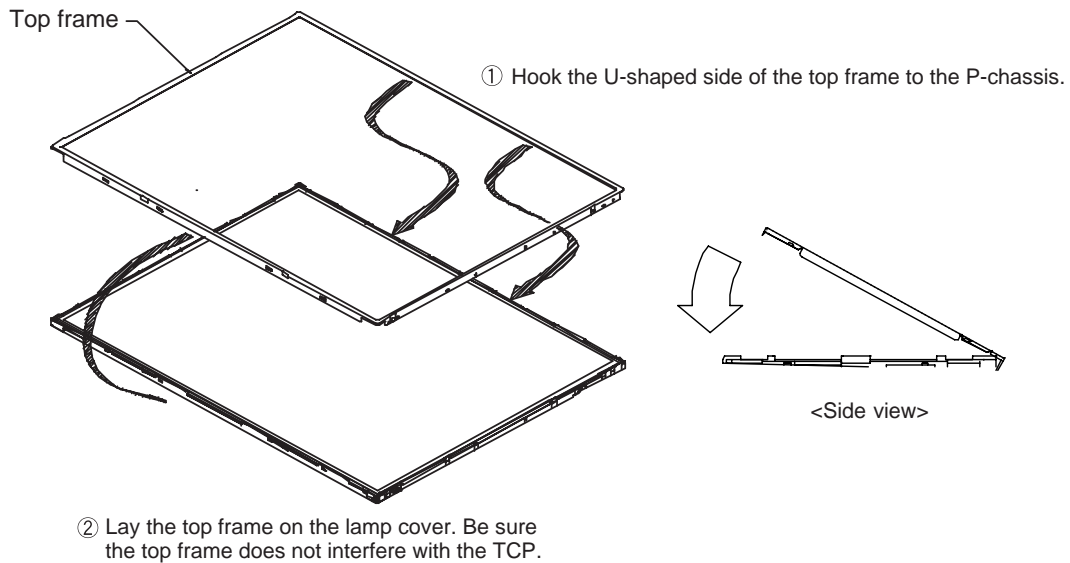


Figure 4-122 Installing the top frame

15. Secure four screws on the side of the module.

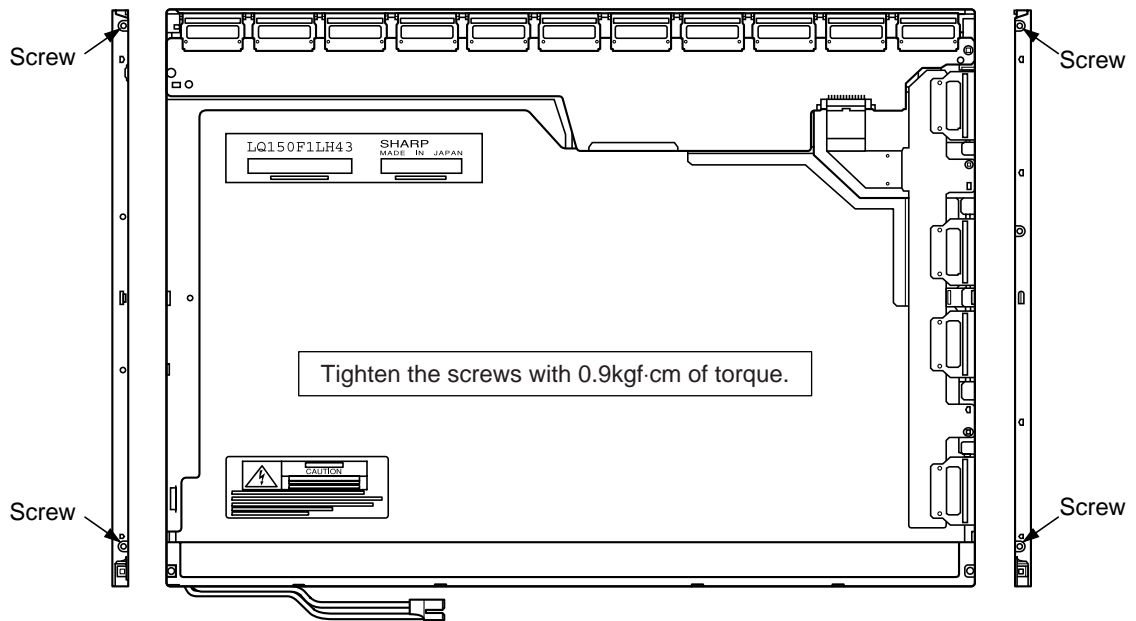


Figure 4-123 Securing the screws

16. Apply the protective cover-G.

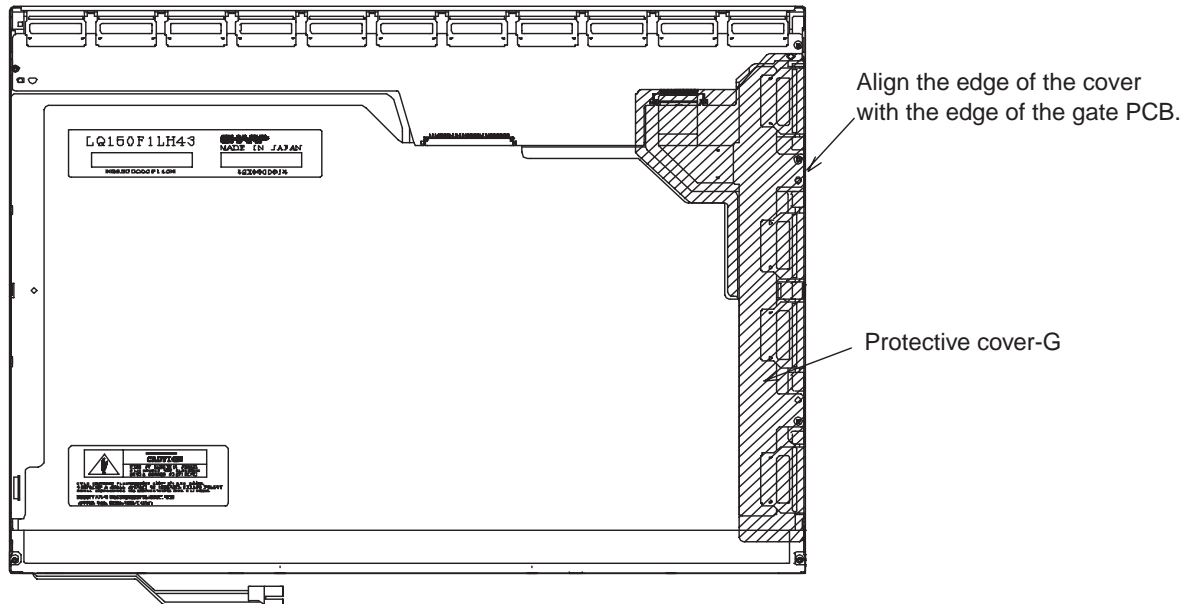


Figure 4-124 Applying the protective cover-G

17. Apply the protective cover-S.

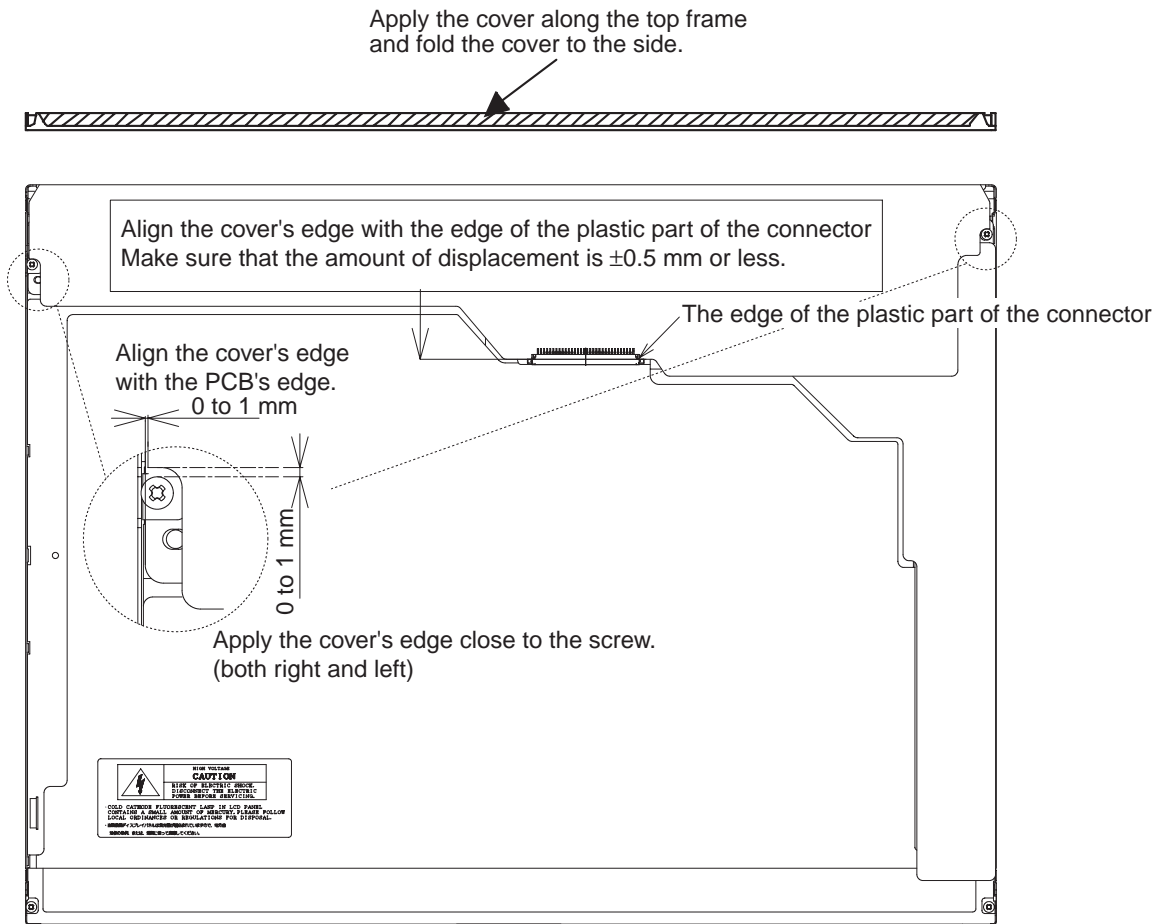


Figure 4-125 Applying the protective cover-S

18. Apply the fixing tape and the HV cable fixing tape.

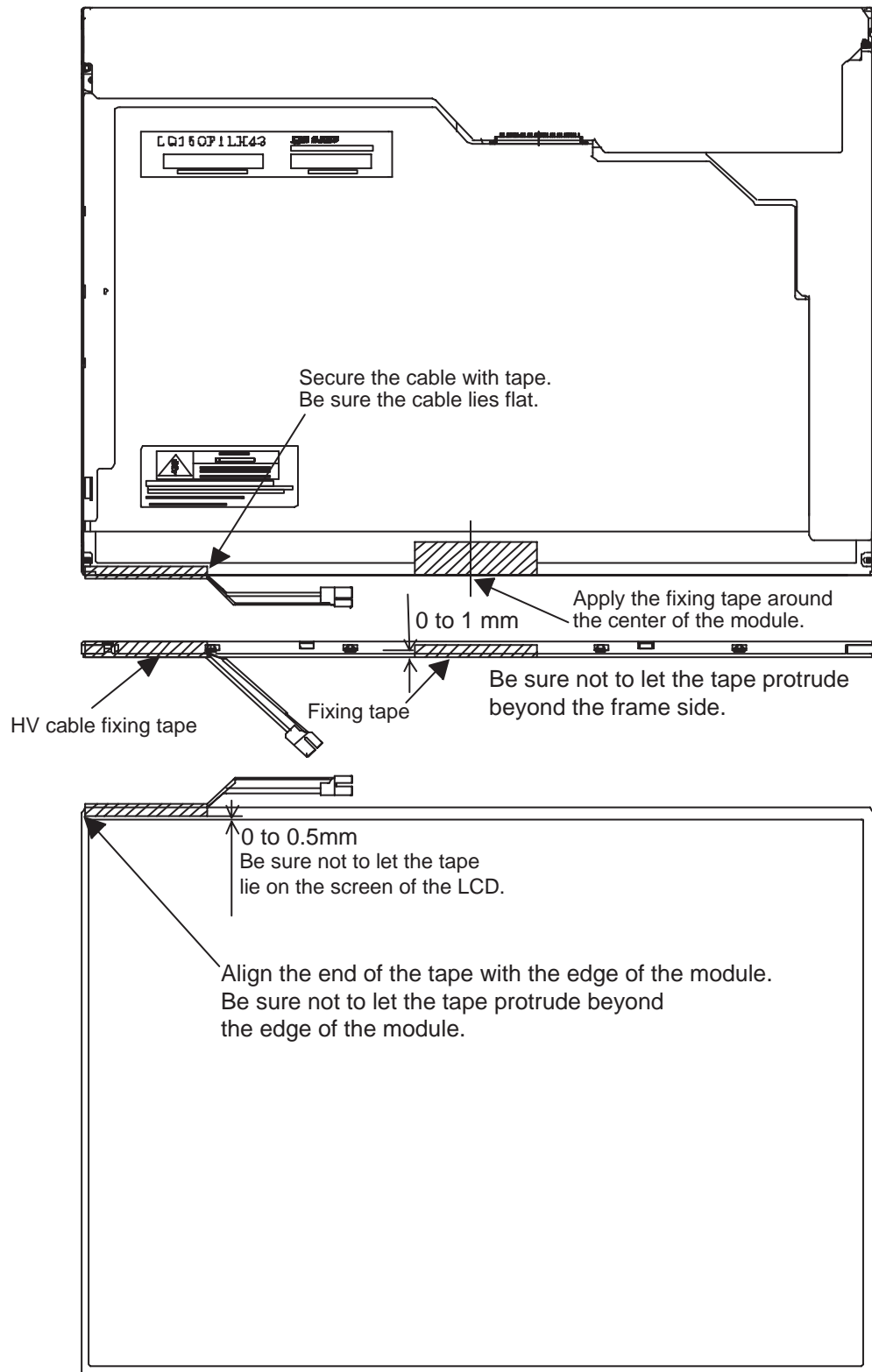


Figure 4-126 Applying the tapes

4.34 TFT FL (Model 15.0 UXGA SHARP LQ150U1LW13)

CAUTION: When you replace the fluorescent lamp, wear finger covers or gloves to avoid contaminating or damaging the LCD panel. Be careful not to let dust or other foreign matter into the module.

Removing the TFT FL (Model 15.0 UXGA SHARP LQ150U1LW13)

To remove the TFT FL (Model 15.0 UXGA SHARP LQ150U1LW13), follow the steps below and refer to Figures 4-127 to 4-135.

1. Turn the LCD module upside down.
2. Remove the **protective cover-S**, the **protective cover-G**, the **aluminum tape**, and the **wire-protective tape**. Be careful not to damage the TCP or ICs. (Dispose of the protective covers and tapes you have removed.)

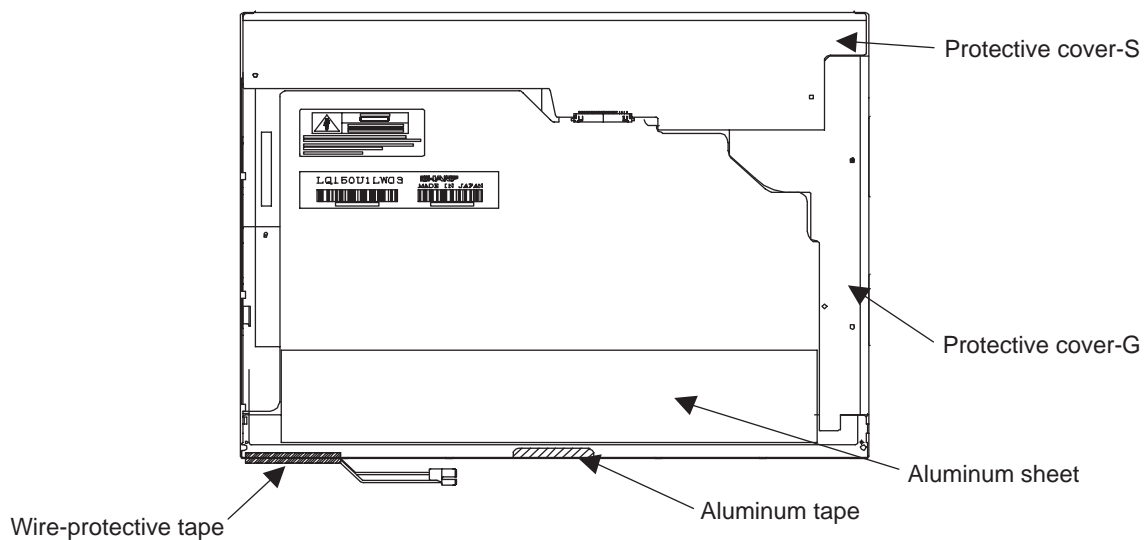


Figure 4-127 Removing the covers and tapes

- Remove **five screws** from the side of the LCD module.

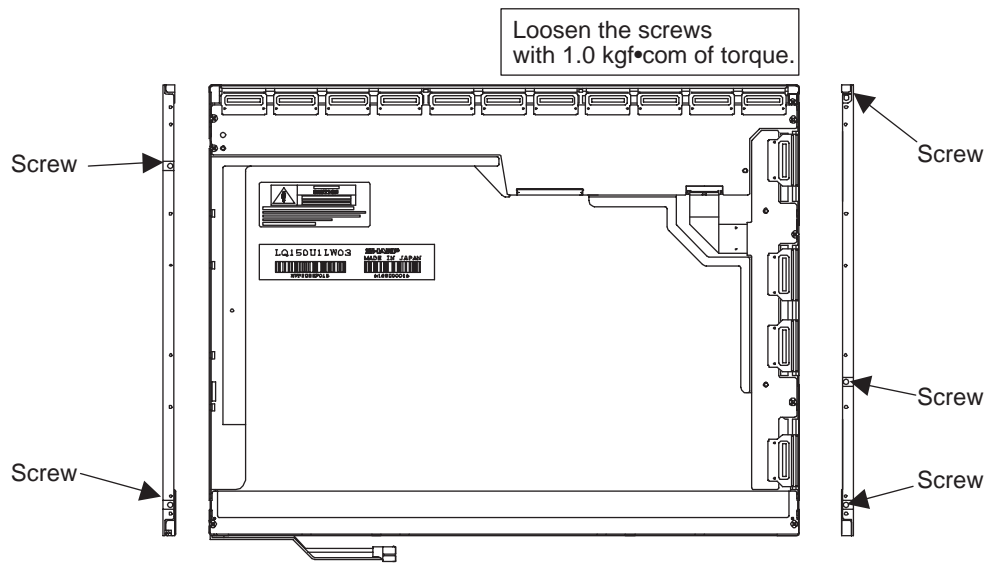


Figure 4-128 Removing the screws

- Turn the LCD module right side up.
- Remove the **top frame**. When you remove it, wear gloves or finger guards to avoid staining or damaging the LCD panel.

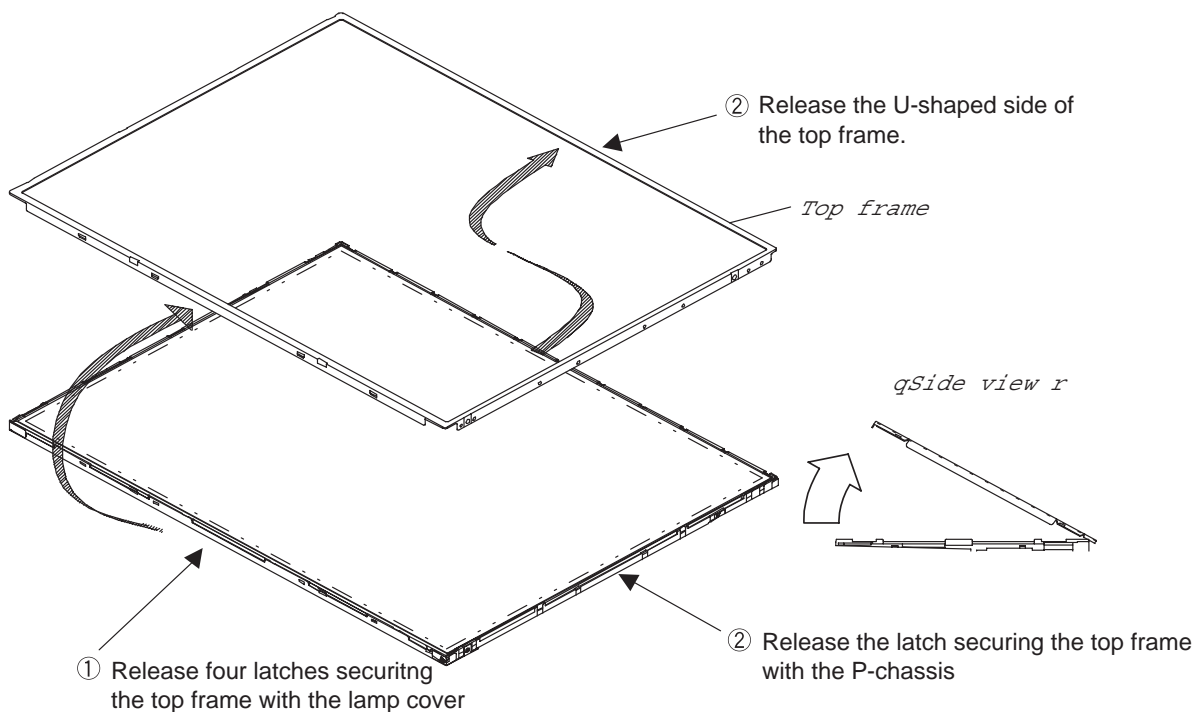


Figure 4-129 Removing the top frame

6. Turn the LCD module upside down.
7. Remove **five screws** securing the PCBs.
8. Disconnect the **FPC**.

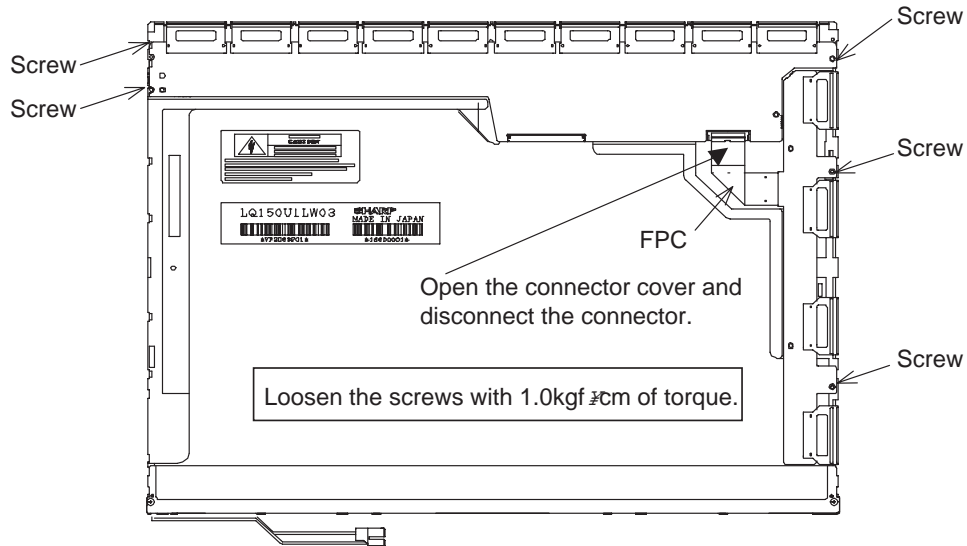


Figure 4-130 Removing five screws and disconnecting the FPC

9. Fold out the PCBs.

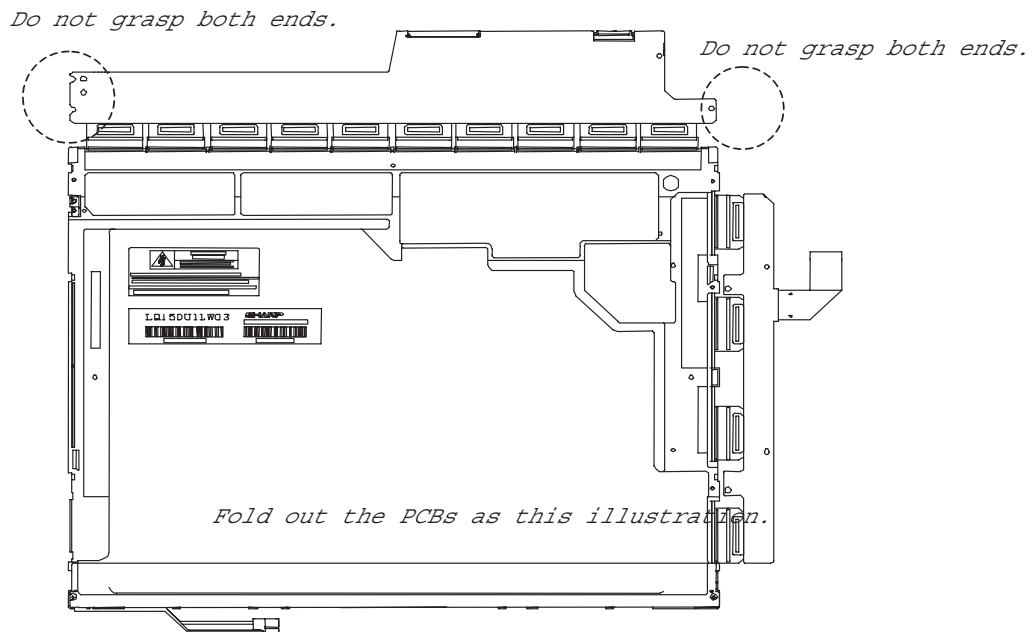


Figure 4-131 Folding out the PCBs

10. Turn the LCD module right side up.
11. Remove the **LCD panel** from the **backlight unit**. When you remove the **LCD panel**, wear finger covers or gloves to avoid staining or damaging the **LCD panel** and the **backlight unit**.

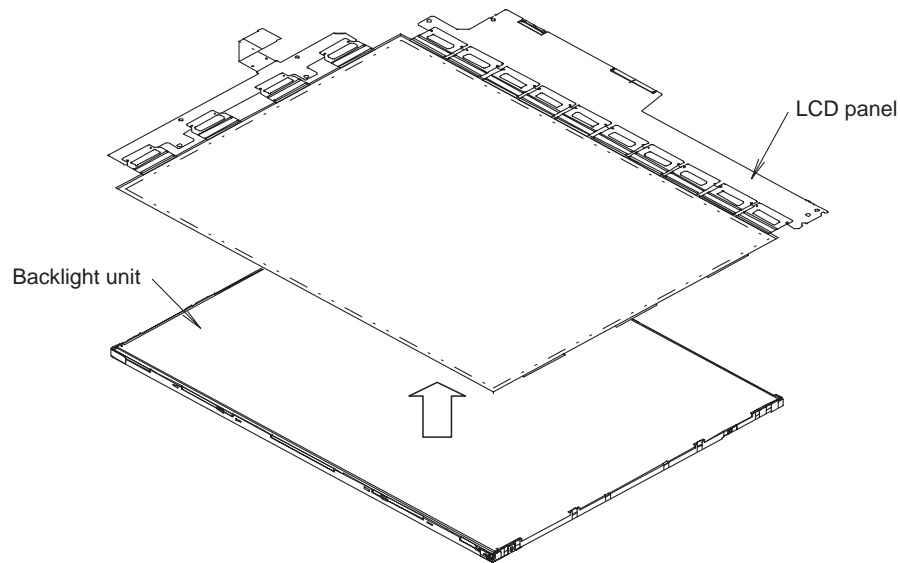


Figure 4-132 Removing the LCD panel

12. Turn the **backlight unit** upside down taking care not to damage or stain the sheets.
13. Remove **two screws** securing the **lamp cover** to remove it.

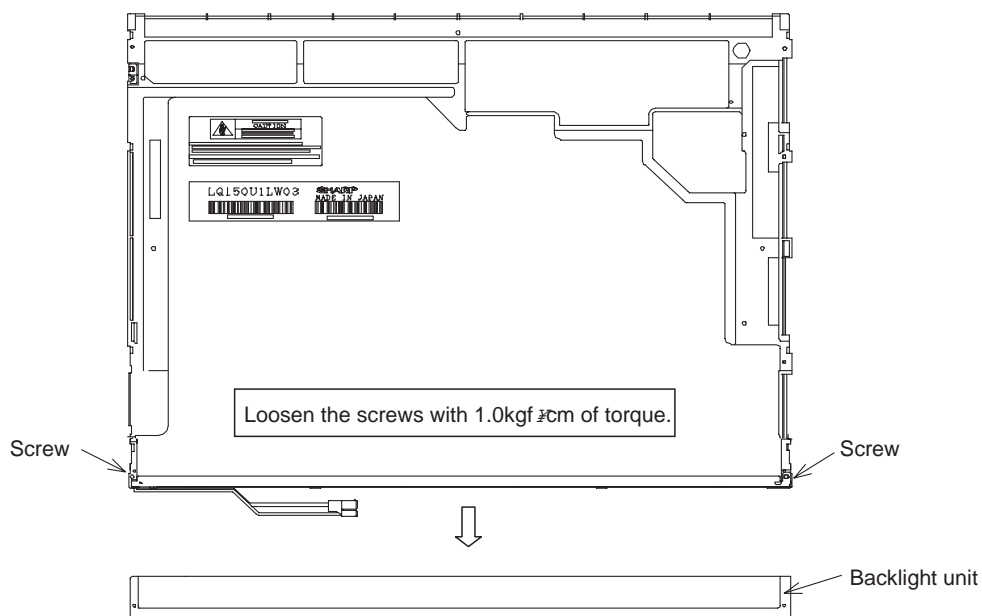


Figure 4-133 Removing the lamp cover

14. Turn the **backlight unit** right side up.
15. Remove **three strips of shield tape**, the **optical sheet**, the **upper lens sheet**, the **lower lens sheet**, the **lower diffuser sheet** and the **light guide sheet**. Be careful not to damage or stain the sheets because they are reused. Dispose of the removed **shield tape**.

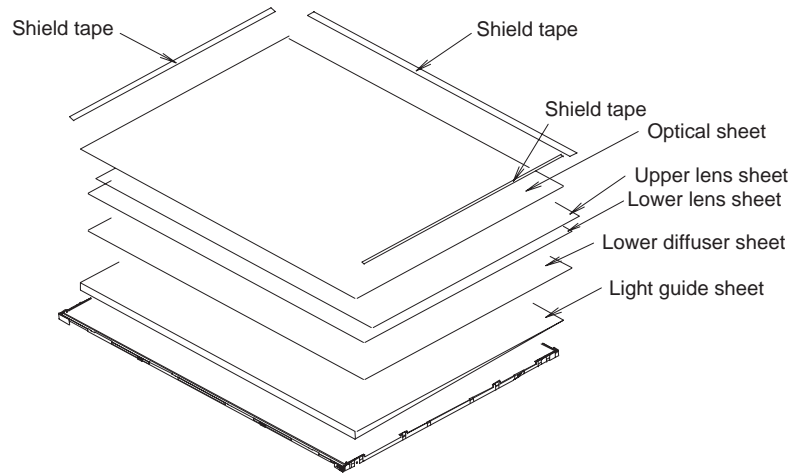


Figure 4-134 Removing the sheets

16. Turn the backlight unit upside down.
17. Gently remove the **FL** taking care not to damage it.

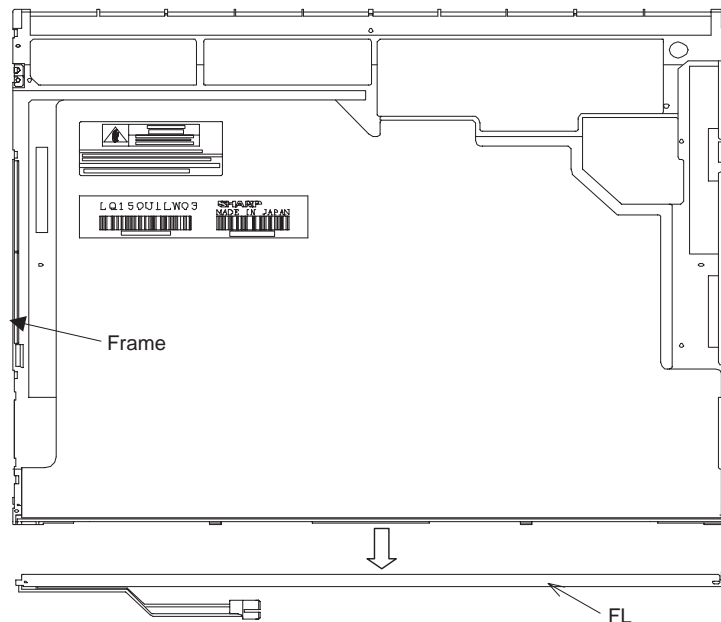


Figure 4-135 Removing the FL

NOTE: Be careful not to crease the reflective sheet when you remove the FL assembly.

Installing the TFT FL (Model 15.0 UXGA SHARP LQ150U1LW13)

To install the TFT FL (Model 15.0 UXGA SHARP LQ150U1LW13), follow the steps below and refer to Figures 4-136 to 4-147.

1. Install a new **FL** unit into the frame.

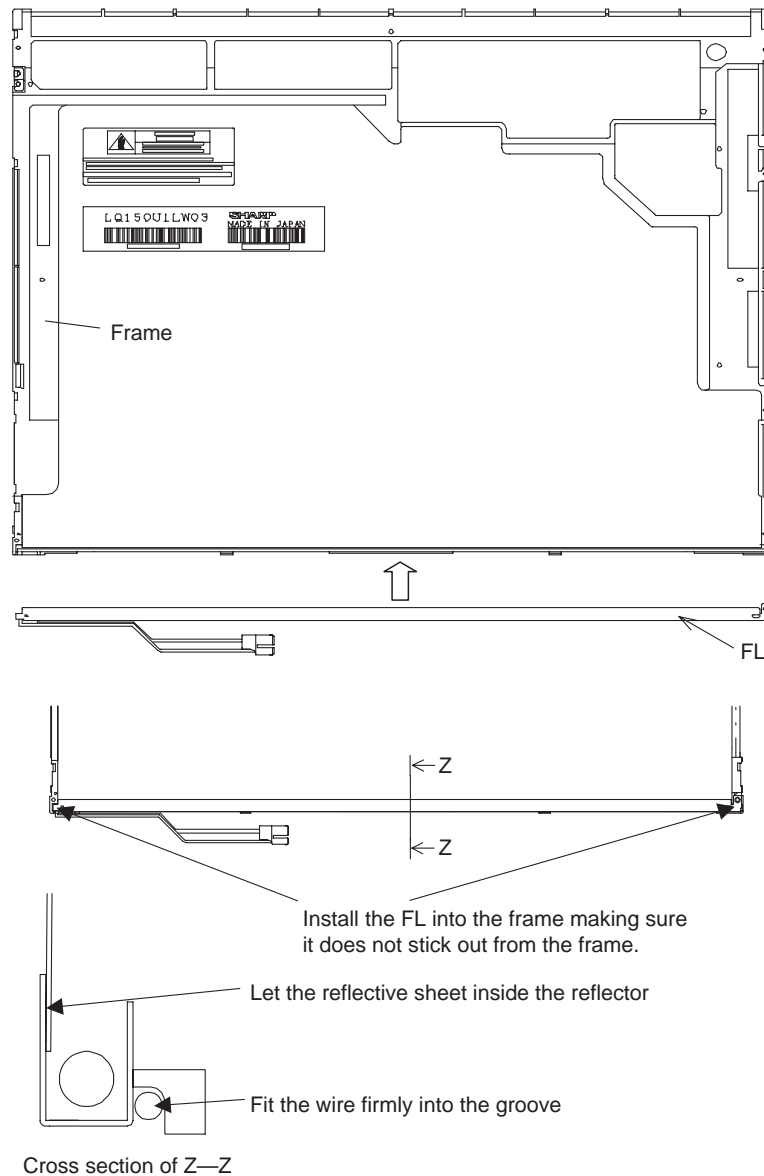


Figure 4-136 Installing the FL

NOTE: Be careful not to crease the reflective sheet when you install the FL unit.

2. Seat the **lamp cover** on the **backlight unit** and secure it with **two screws**.

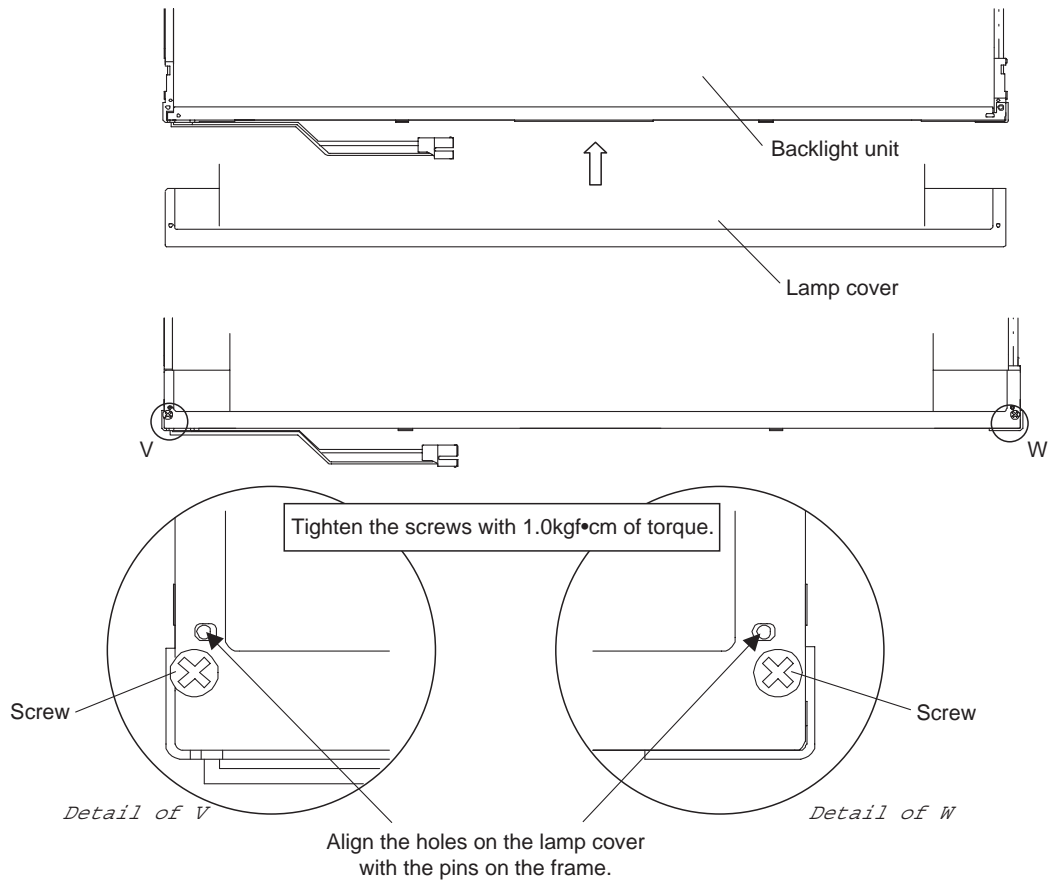


Figure 4-137 Installing the lamp cover

3. Install the **light guide sheet** in the **backlight unit**.

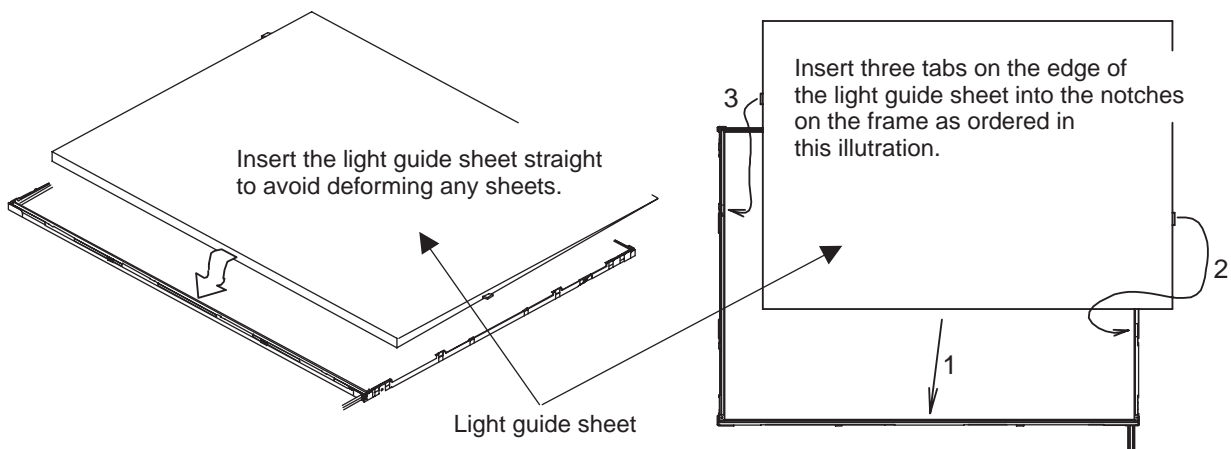


Figure 4-138 Installing the light guide sheet

4. Lay the **lower diffuser sheet**, the **lower lens sheet**, the **upper lens sheet** and the **optical sheet** on the **backlight unit**. Be careful not to stain or damage any sheets.

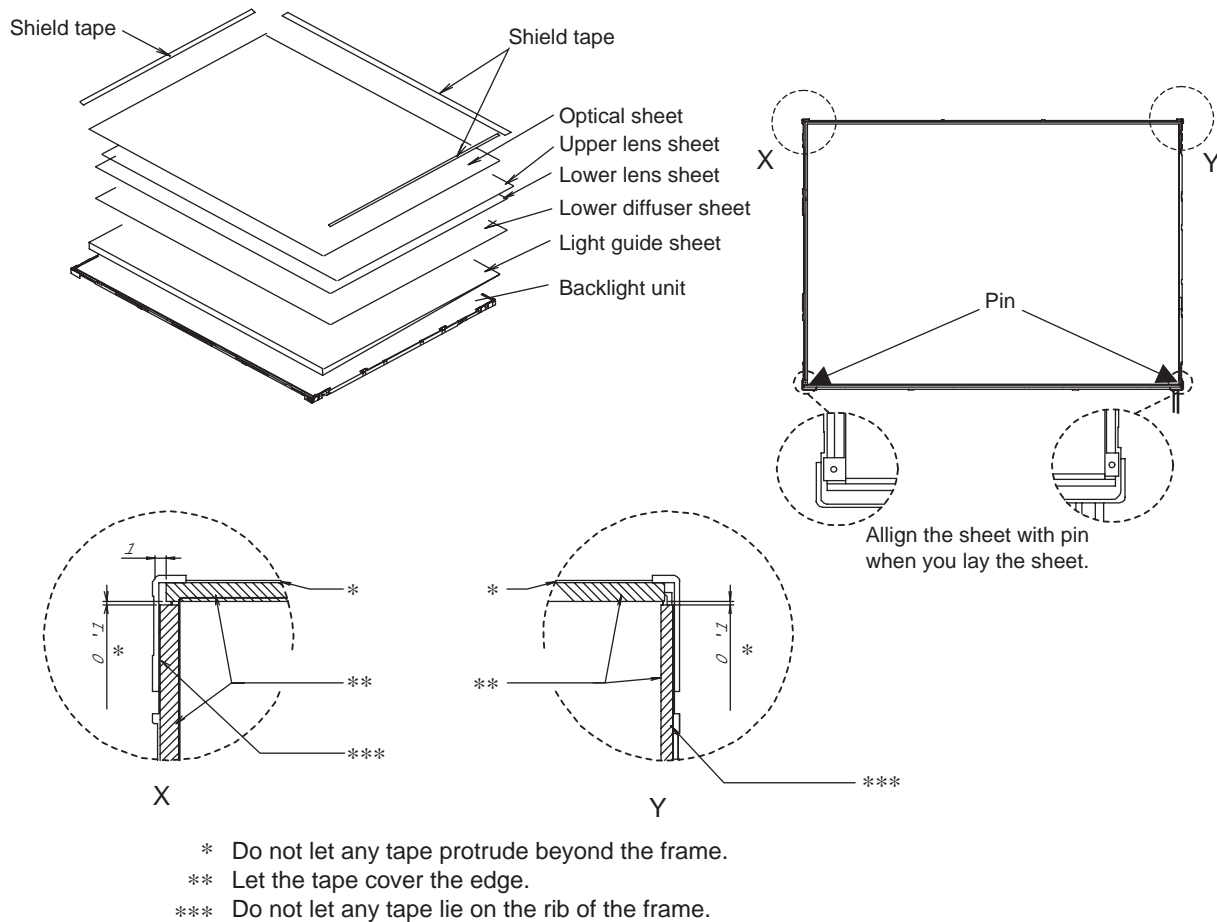


Figure 4-139 Installing the sheet

5. Seat the **LCD panel** on the **backlight unit** assembled by the steps above. Make sure there is no dust between the **LCD panel** and the **backlight unit**. If you find any foreign matter, remove it.

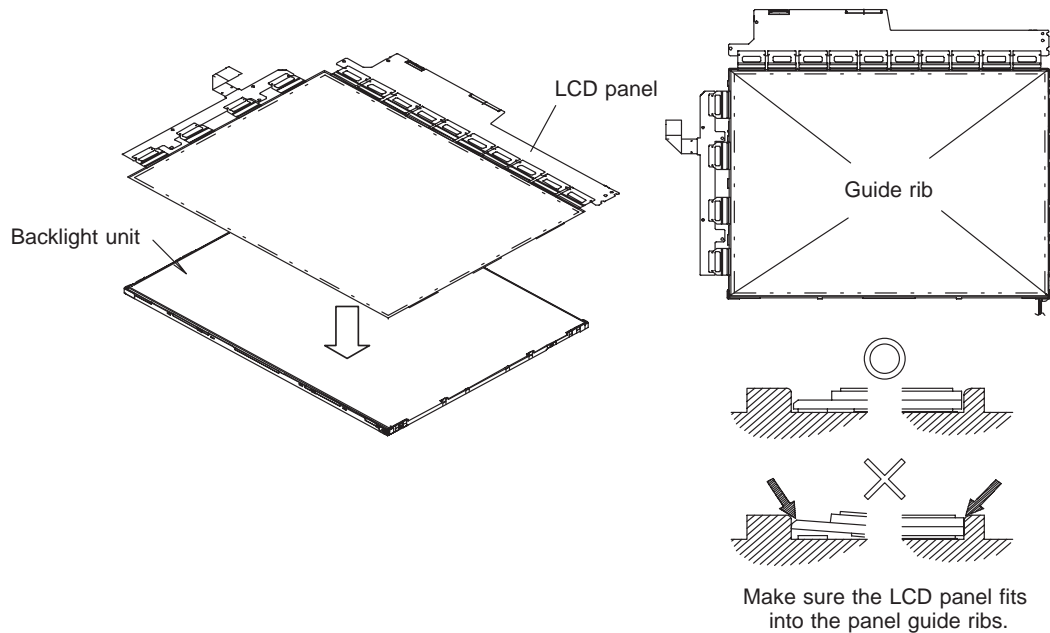


Figure 4-140 Installing the LCD panel

6. Fold the TCP of the source PCB, then the TCP of the gate PCB down.

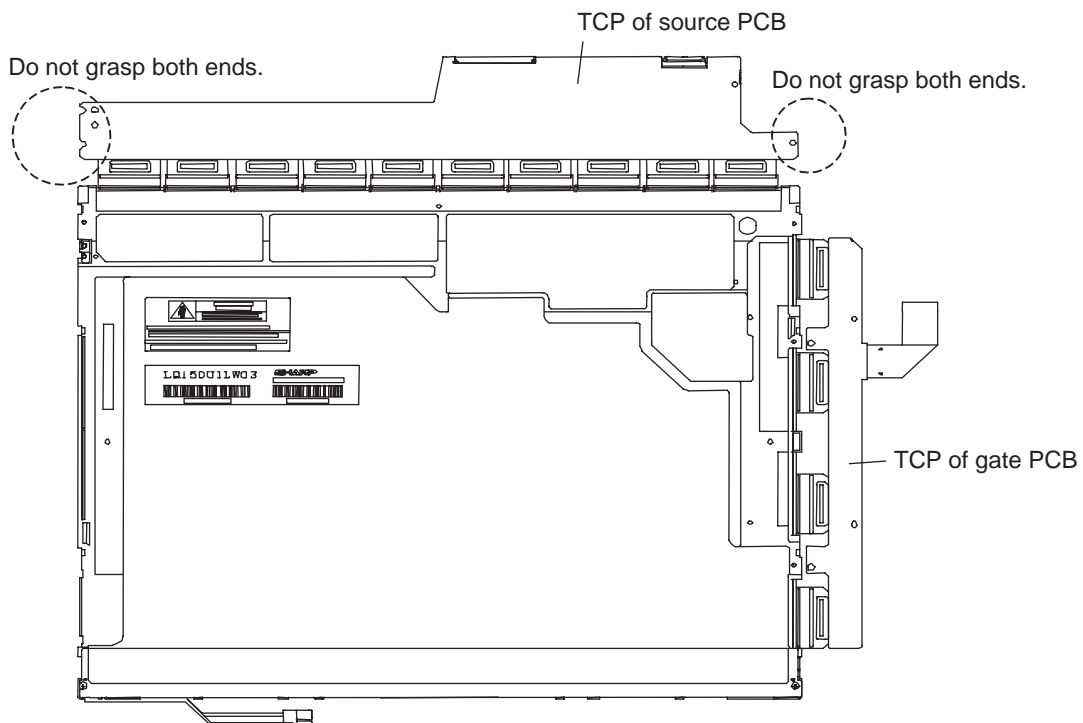


Figure 4-141 Folding TCPs down

7. Secure the TCP of the source PCB with **three screws**.
8. Secure the TCP of the gate PCB with **two screws**.
9. Connect the FPC to the connector on the source PCB.

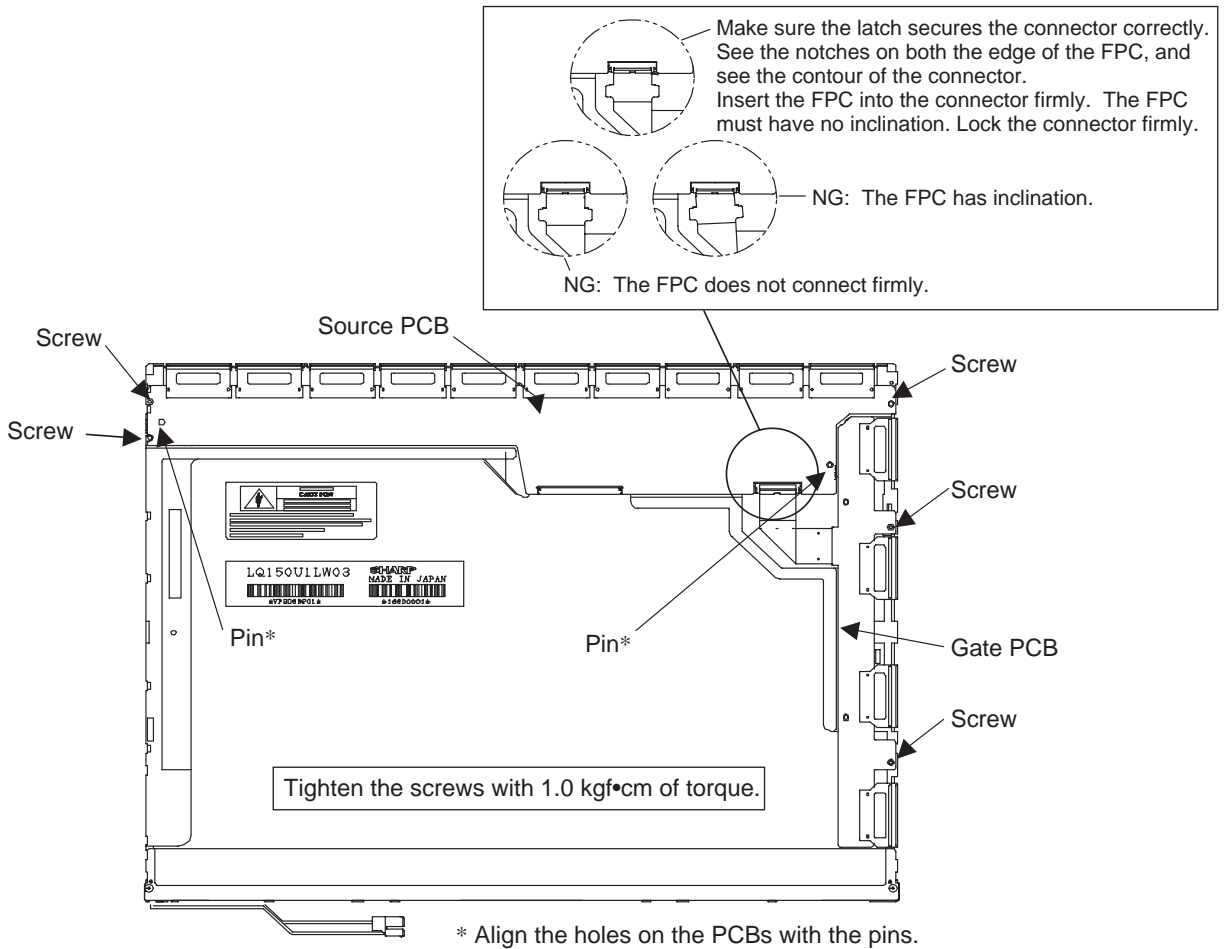
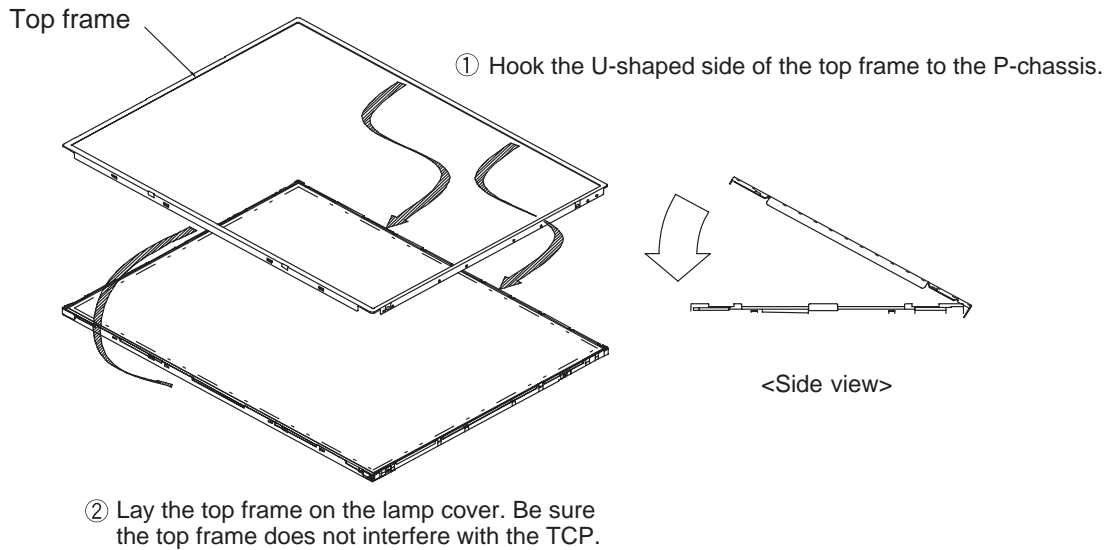
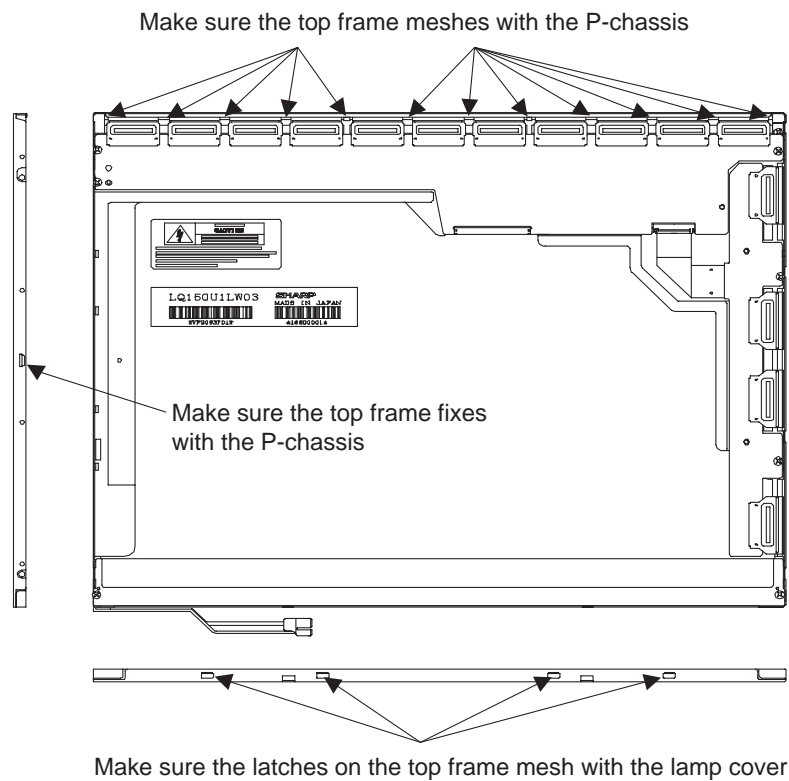


Figure 4-142 Securing the TCPs and connecting the FPC

10. Install the **top frame**.*Figure 4-143 Installing the top frame*11. Secure the **top frame** and the lamp cover with four latches.*Figure 4-144 Installing the top frame*

12. Secure **five M2×2 screws** on the side of the module.

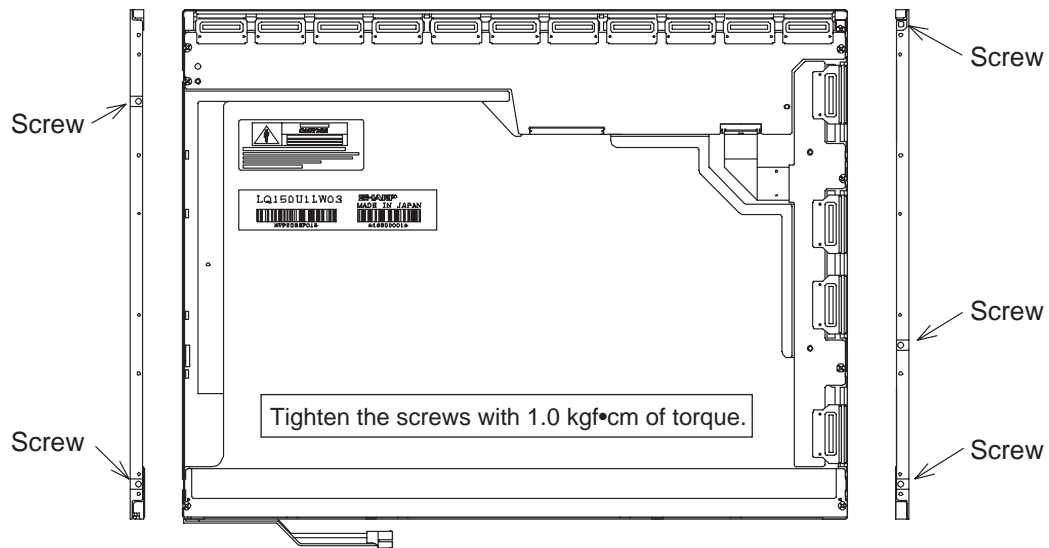


Figure 4-145 Securing the screws

13. Apply the **protective cover-G**.

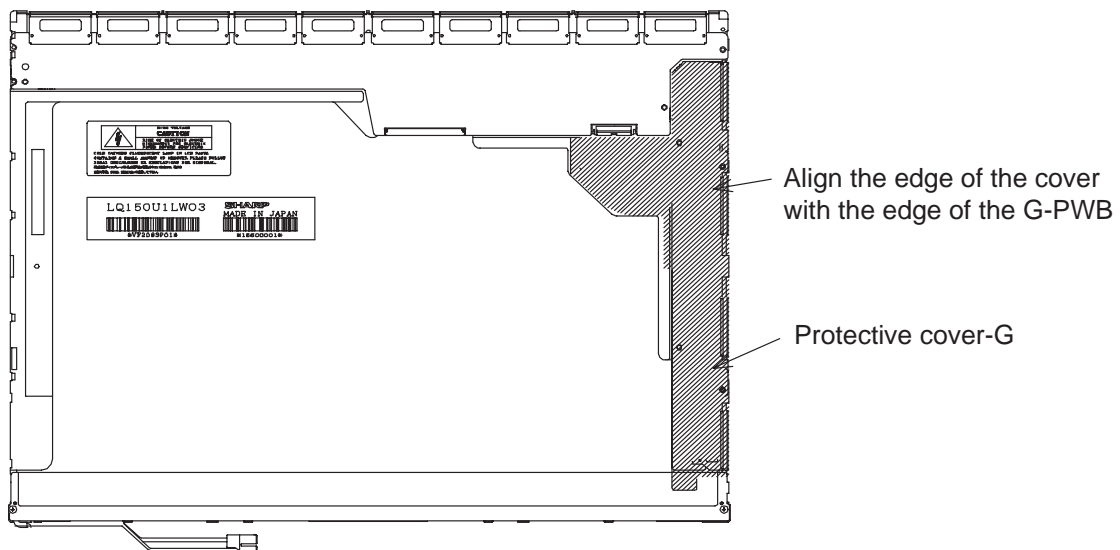


Figure 4-146 Applying the protective cover-G

14. Apply the **protective cover-S**, the **aluminum tape** and the **wire-protective tape**.

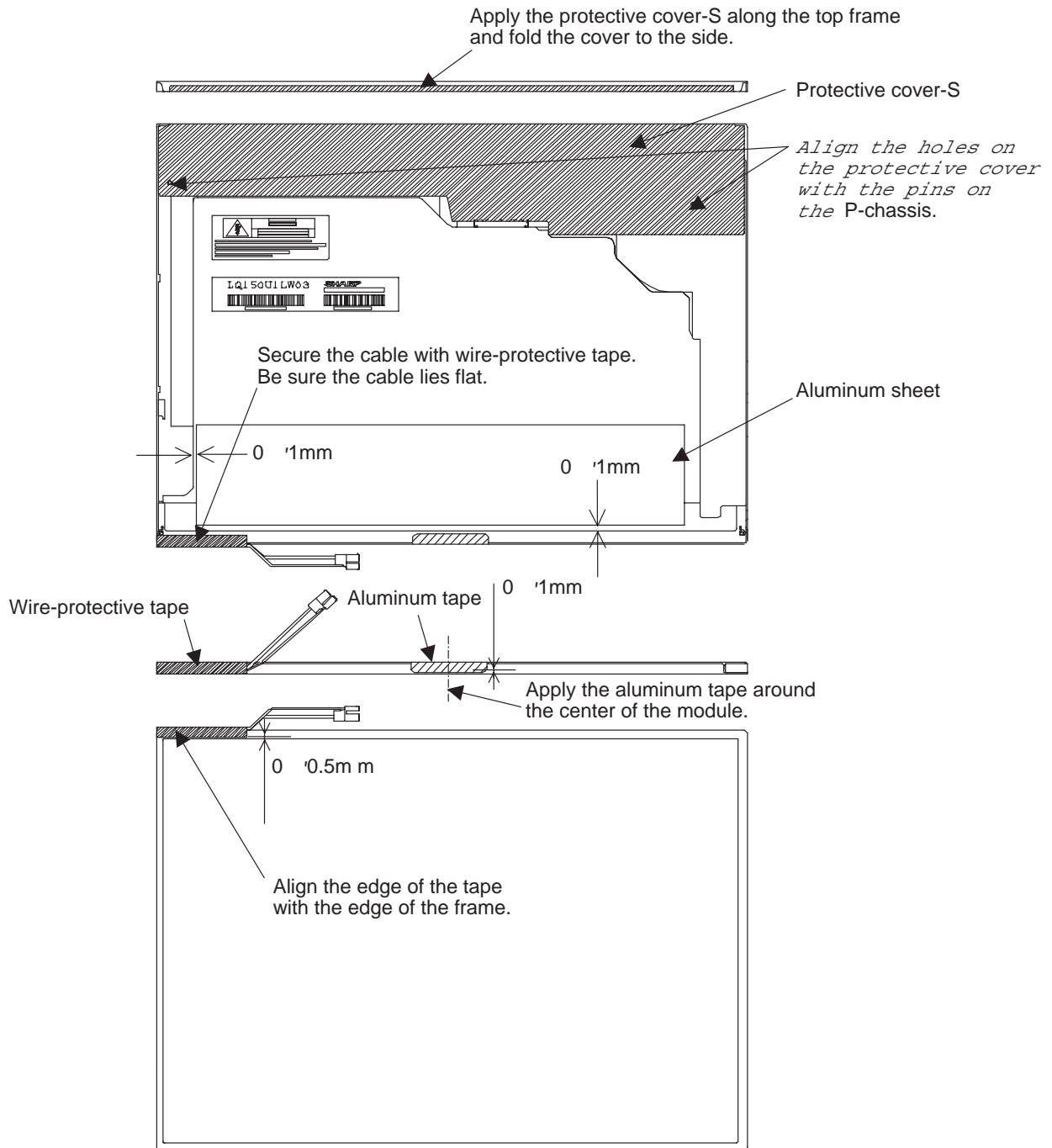


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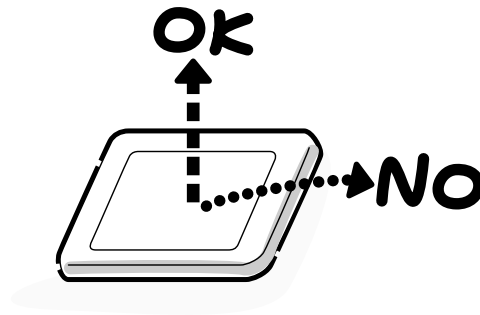
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Appendix A Handling the LCD Module

Precautions for handling the LCD module

The LCD module can be easily damaged during assembly or disassembly. Observe the following precautions when handling the LCD module:

1. When installing the LCD module in the LCD cover, be sure to seat it so that it is properly aligned and maximum visibility of the display is maintained.



2. For the LCD module, do not force the module into place, because stress can affect its performance.

Also, the panel's polarized surface is easily scarred, so be carefully when handling it.



3. If the panel's surface gets dirty, wipe it with cotton or a soft cloth. If it is still dirty, try breathing on the surface to create a light condensate and wipe it again.

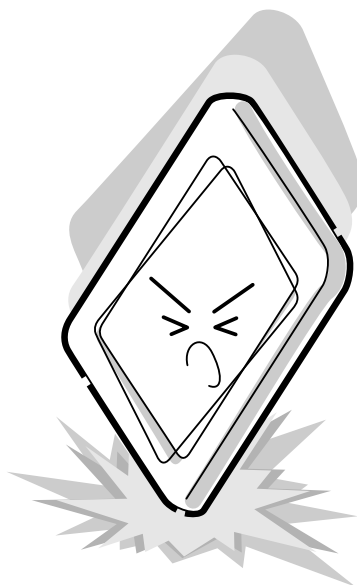
If the surface is very dirty, we recommend a CRT cleaning agent. Apply the agent to a cloth and then wipe the panel's surface. Do not apply cleanser directly to the panel.



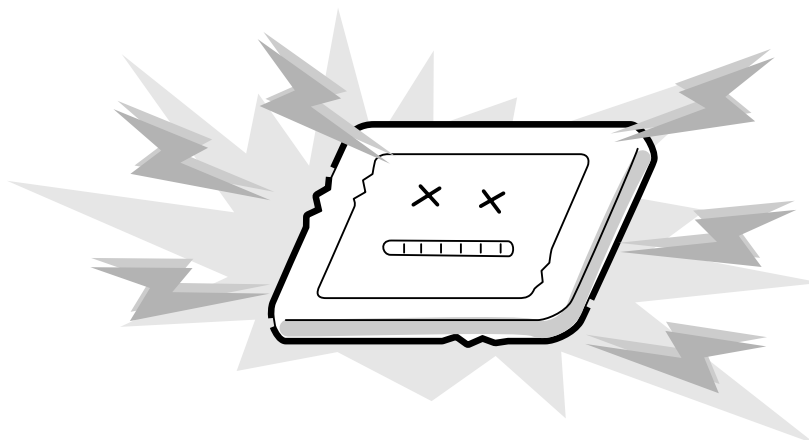
4. If water or other liquid is left on the panel's surface for a long period, it can change the screen's tint or stain it. Be sure to quickly wipe off any liquid.



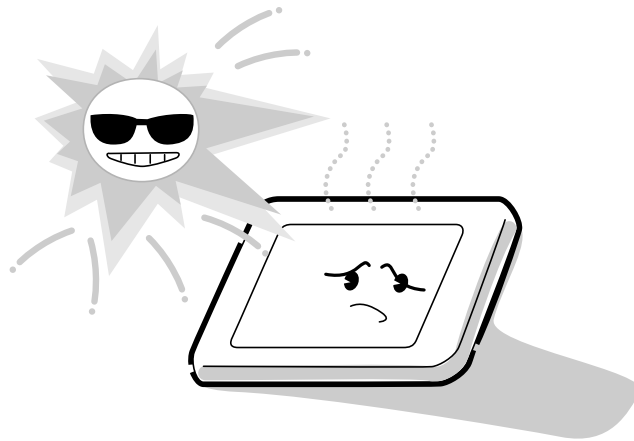
5. Glass is used in the panel, so be careful not to drop it or let it strike a hard object, which could cause breakage or cracks.



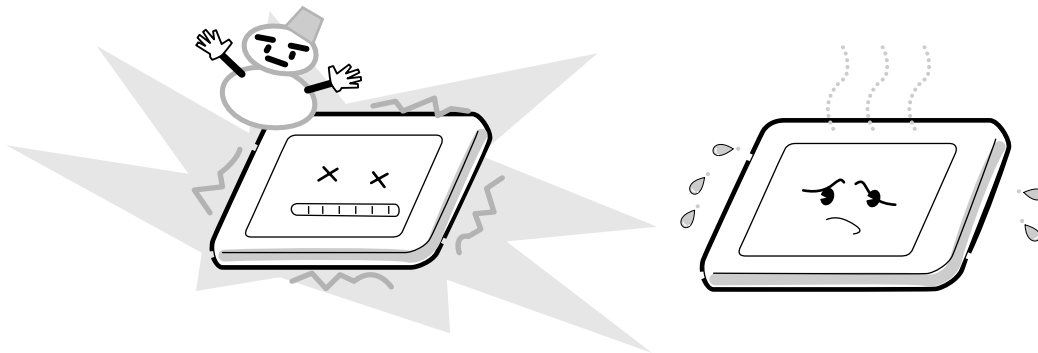
6. CMOS-LSI circuits are used in the module, so guard against damage from electrostatic discharge. Be sure to wear a wrist or ankle ground when handling the module.



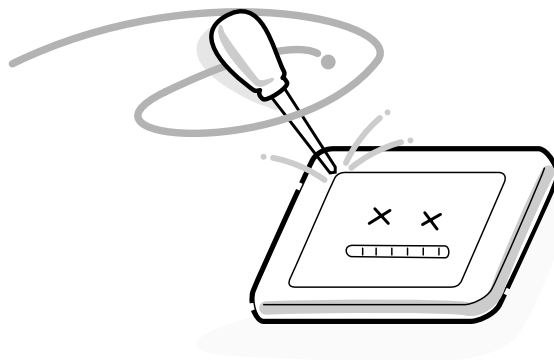
7. Do not expose the module to direct sunlight or strong ultraviolet rays for long periods.



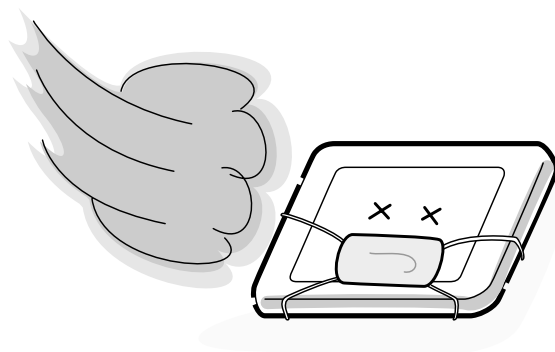
8. Do not store the module at temperatures below specifications. Cold can cause the liquid crystals to freeze, lose their elasticity or otherwise suffer damage.



9. Do not disassemble the LCD module. Disassembly can cause malfunctions.



10. If you transport the module, do not use packing material that contains epoxy resin (amine) or silicon glue (alcohol or oxime). These materials can release gas that can damage the panel's polarization.



Appendix B Board Layout

B.1 System Board (FQDSY*) Front View

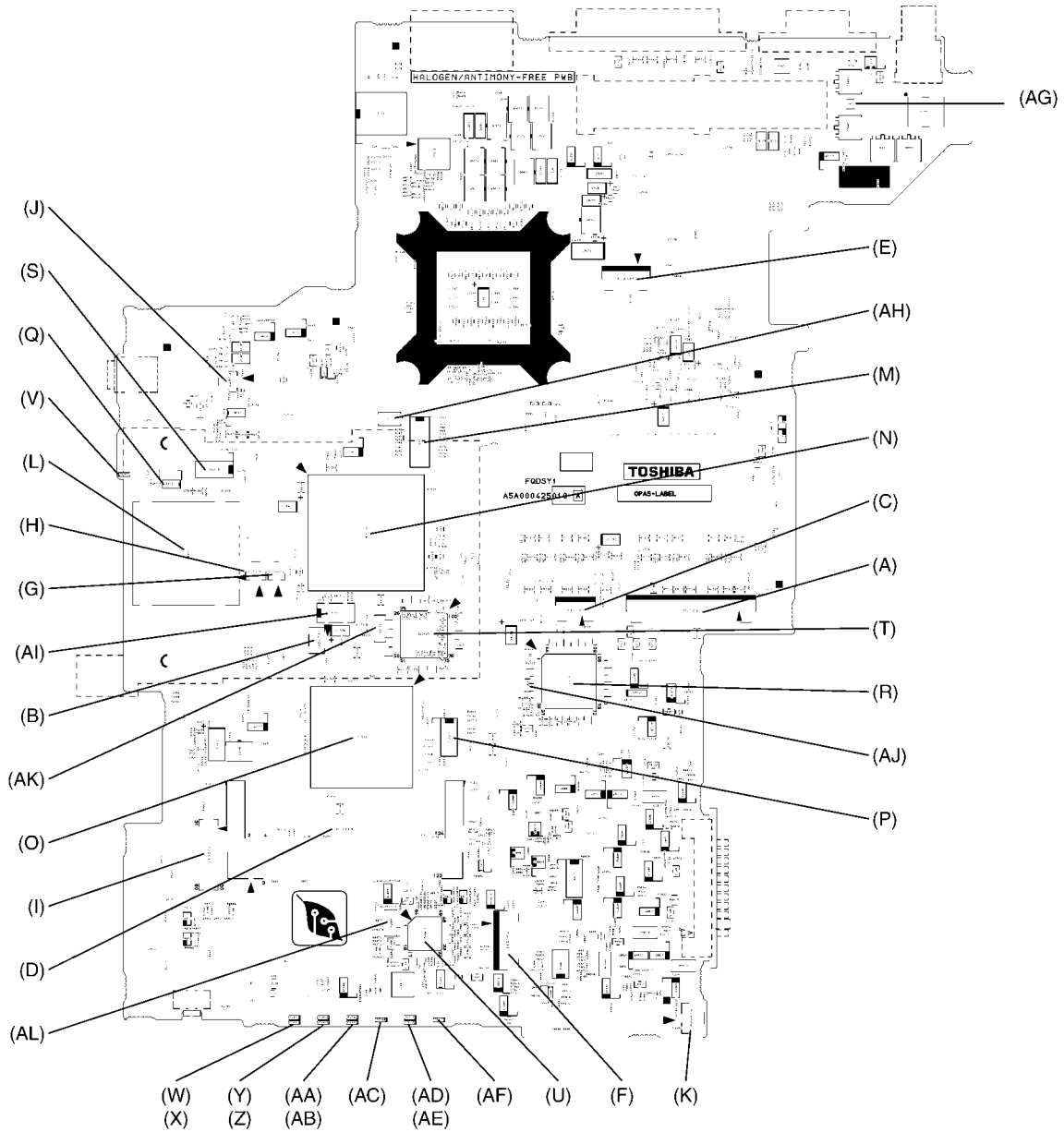


Figure B-1 System board (FQDSY*) layout (front)

Table B-1 System board (FQDSY*) layout (front) (1/2)

Mark	Number	Name
(A)	PJ123	Keyboard I/F Connector
(B)	PJ326	Debug Port I/F Connector
(C)	PJ2003	Touch Pad I/F Connector
(D)	PJ2015	Mini PCI Card I/F Connector
(E)	PJ2025	Switch Board (FQDSQ*) I/F Connector
(F)	PJ4900	Bluetooth I/F Connector
(G)	PJ5004	Right Speaker I/F Connector
(H)	PJ5005	Left Speaker I/F Connector
(I)	PJ5006	Sound Board (FQDSD*) I/F Connector
(J)	PJ8770	Cooling fan I/F Connector
(K)	PJ9999	RTC Battery I/F Connector
(L)	IS4004	SD Card I/F Connector
(M)	IC9	Clock Generator ICS950812
(N)	IC1500	I/O Controller Hub (ICH4-M)
(O)	IC1508	YEBISU 3S
(P)	IC1510	PC Card Power Switch MIC2563A
(Q)	IC1511	SD Card Current-Limited Switch MAX1607ESA
(R)	IC2000	EC/KBC M306K9FCLRP
(S)	IC2018	RS-232 Transceiver MAX3243
(T)	IC2103	CD Play Controller OZ168
(U)	IC8972	Power Supply Controller (PSC)
(V)	DS1500	SD Card LED
(W)	DS2000	DC-IN LED (Green)
(X)	DS2001	DC-IN LED (Orange)
(Y)	DS2002	Power LED (Green)
(Z)	DS2003	Power LED (Orange)

Table B-1 System board (FQDSY*) layout (front) (2/2)

Mark	Number	Name
(AA)	DS2004	Battery LED (Green)
(AB)	DS2005	Battery LED (Orange)
(AC)	DS2006	HDD LED
(AD)	DS2008	Slim Select Bay (Green)
(AE)	DS2009	Slim Select Bay (Orange)
(AF)	DS2010	Wireless Communication LED
(AG)	F8800	Fuse for DC-IN (8A)
(AH)	X1	Clock for Clock Generator (14.31818MHz)
(AI)	X1500	Clock for RTC (32.768KHz)
(AJ)	X2000	Clock for EC/KBC (8MHz)
(AK)	X2100	Clock for OZ168 (8MHz)
(AL)	X8970	Clock for PSC (4MHz)

B.2 System Board (FQDSY*) Back View

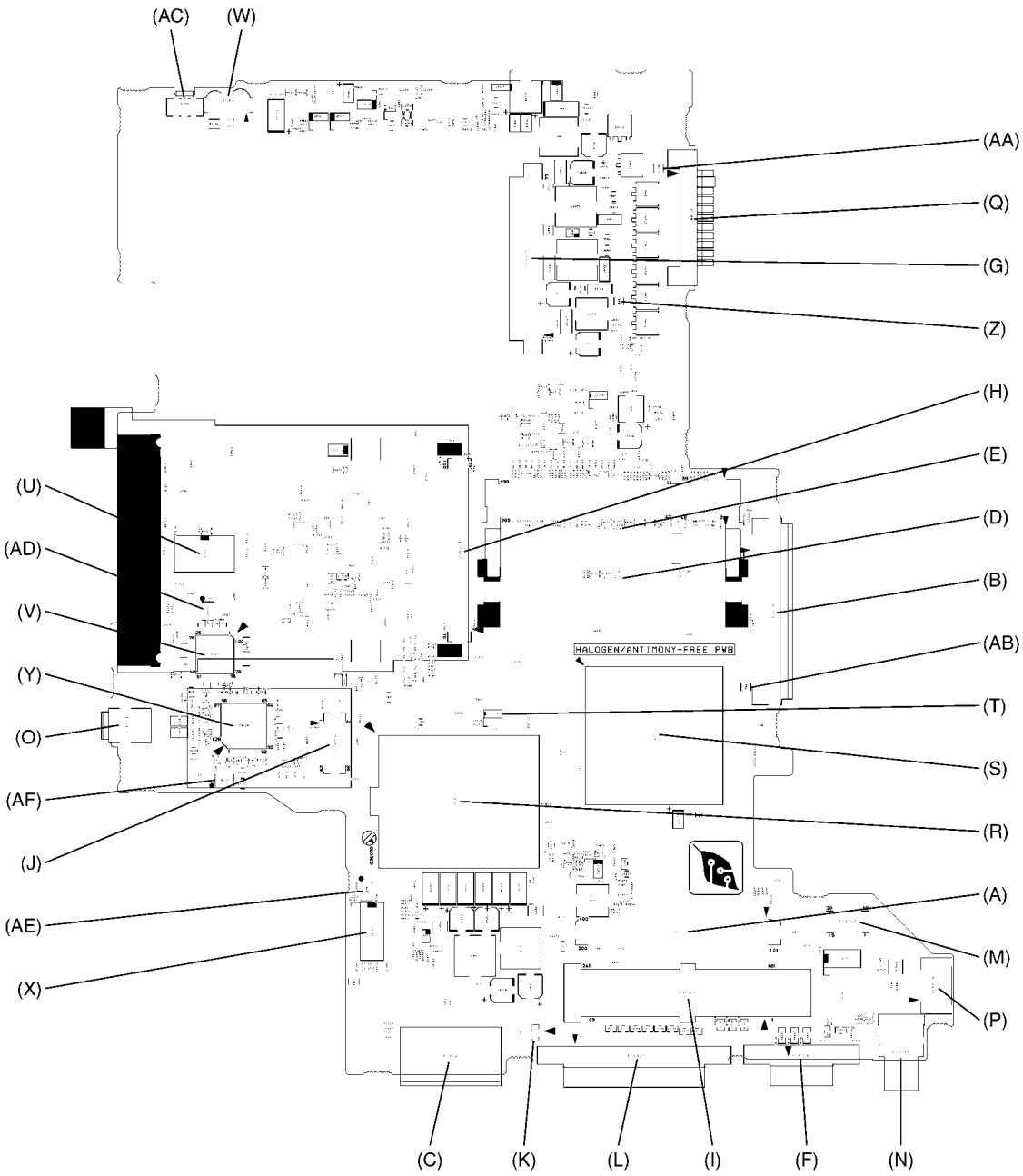


Figure B-2 System board (FQDSY*) layout (back)

Table B-2 System board (FQDSY*) layout (back) (1/1)

Mark	Number	Name
(A)	PJ100	VGA Board (FQDVG*) I/F Connector
(B)	PJ117	TOSHIBA Style Bay I/F Connector
(C)	PJ124	RJ-45 & RJ-11 I/F Connector
(D)	PJ1001	SO-DIMM Socket Connector 0
(E)	PJ1002	SO-DIMM Socket Connector 1
(F)	PJ1016	RGB I/F Connector
(G)	PJ1509	HDD I/F Connector
(H)	PJ1512	PC Card I/F Connector
(I)	PJ2007	Docking I/F Connector
(J)	PJ2017	MDC I/F Connector
(K)	PJ2018	Modem Cable I/F Connector
(L)	PJ2020	Parallel I/F Connector
(M)	PJ2040	USB Board (FQDUB*) I/F Connector
(N)	PJ4015	Video Out I/F Connector
(O)	PJ6100	IEEE 1394 I/F Connector
(P)	PJ8800	DC-IN I/F Connector
(Q)	PJ8810	Battery I/F Connector
(R)	IS1000	Intel Banias Processor
(S)	IC1001	Memory Controller Hub (MCH-M)
(T)	IC1014	Temperature Monitor ADM1032
(U)	IC1101	Firmware Hub (FWH)
(V)	IC2017	Super I/O LPC47N227
(W)	IC2019	Infrared Transceiver HSDL-3602
(X)	IC4500	LAN Controller 82562ET
(Y)	IC6100	IEEE 1394 Controller TSB43AB22
(Z)	F8801	Fuse for Docking I/F (3.15A)

Table B-2 System board (FQDSY*) layout (back) (2/2)

Mark	Number	Name
(AA)	F8810	Fuse for Battery (10A)
(AB)	F8820	Fuse for Slim Select Bay (10A)
(AC)	S2302	Wireless Communication Switch
(AD)	X2002	Clock for Super I/O (14.31818MHz)
(AE)	X4500	Clock for 82562ET (25MHz)
(AF)	X6100	Clock for TSB43AB22 (24.576MHz)

B.3 VGA Board (FQDVG*) Front View

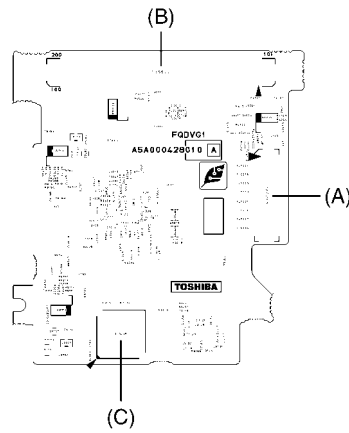


Figure B-3 VGA board (FQDVG*) layout (front)

Table B-3 VGA board (FQDVG*) layout (front)

Mark	Number	Name
(A)	PJ4205	LCD I/F Connector
(B)	PJ5500	System Board (FQDSY*) I/F Connector
(C)	IC3005	VRAM DDR SDRAM 128Mbit (4Mx32)

B.4 VGA Board (FQDVG*) Back View

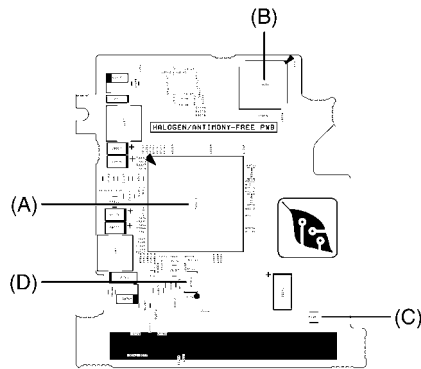


Figure B-4 VGA board (FQDVG*) layout (back)

Table B-4 VGA board (FQDVG*) layout (back)

Mark	Number	Name
(A)	IC3002	VGAC GeForce4 420Go
(B)	IC3004	VRAM DDR SDRAM 128Mbit (4Mx32)
(C)	F4001	Fuse for LCD (3.15A)
(D)	X3000	Clock for VGAC (27MHz)

B.5 Sound Board (FQDSD*) Front View

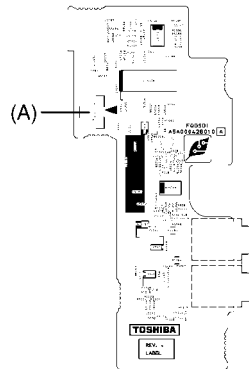


Figure B-5 Sound board (FQDSD*) layout (front)

Table B-5 Sound board (FQDSD*) layout (front)

Mark	Number	Name
(A)	PJ5002	Internal Microphone I/F Connector

B.6 Sound Board (FQDSD*) Back View

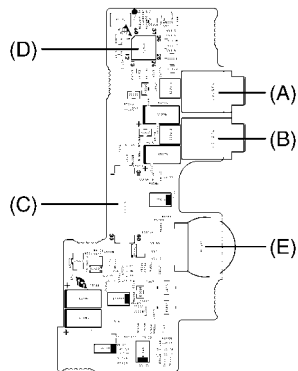


Figure B-6 Sound board (FQDSD*) layout (back)

Table B-6 Sound board (FQDSD*) layout (back)

Mark	Number	Name
(A)	PJ5000	External Microphone I/F Connector
(B)	PJ5003	Headphone I/F Connector
(C)	PJ5007	System Board (FQDSY*) I/F Connector
(D)	IC5000	CODEC AD1981B
(E)	VR5000	Volume Control

B.7 USB Board (FQDUB*) Back View

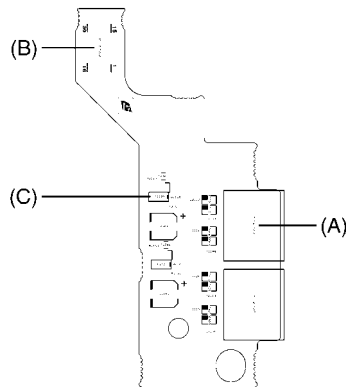


Figure B-7 USB board (FQDUB*) layout (back)

Table B-7 USB board (FQDUB*) layout (back)

Mark	Number	Name
(A)	PJ2033	USB I/F Connector
(B)	PJ2042	System Board (FQDSY*) I/F Connector
(C)	IC2020	USB Current-Limited Switch MAX1922ESA

Appendix C Pin Assignments

System Board (FQDSY*)

C.1 PJ100 VGA Board (FQDVG*) I/F Connector (200-pin)

Table C-1 VGA board (FQDVG*) I/F connector pin assignments (200-pin) (1/3)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	GND	-	2	GND	-
3	GND	-	4	AGAD00-PQP	I/O
5	AGAD01-PQP	I/O	6	GND	-
7	AGAD03-PQP	I/O	8	AGAD02-PQP	I/O
9	AGAD05-PQP	I/O	10	AGAD04-PQP	I/O
11	GND	-	12	AGAD06-PQP	I/O
13	AGAD07-PQP	I/O	14	AGAD08-PQP	I/O
15	AGAD09-PQP	I/O	16	GND	-
17	ADSTB0-PQP	I/O	18	ADSTB0-PQN	I/O
19	GND	-	20	AGAD10-PQP	I/O
21	AGAD11-PQP	I/O	22	AGAD12-PQP	I/O
23	AGAD14-PQP	I/O	24	AGAD13-PQP	I/O
25	AGAD15-PQP	I/O	26	GND	-
27	AGCBE0-PQN	I/O	28	AGCBE1-PQN	I/O
29	GND	-	30	AGSBA4-PQP	I
31	AGSBA5-PQP	I	32	AGSBA7-PQP	I
33	AGSBA6-PQP	I	34	AGSBA0-PQP	I
35	AGSBA2-PQP	I	36	GND	-
37	AGSBA1-PQP	I	38	AGSBA3-PQP	I
39	GND	-	40	AGSBST-PQP	I
41	AGSBST-PQN	I	42	GND	-
43	AGST2-PQP	O	44	AGGNT-PQN	O
45	AGST0-PQP	O	46	GND	-
47	AGREQ-PQN	I	48	AGST1-PQP	O
49	AGWBF-PQN	I	50	AGPIPE-PQN	I
51	AGRBF-PQN	I	52	GND	-
53	AGVRGC-PXP	I	54	GND	-
55	GND	-	56	AGVRCG-PXP	O
57	GND	-	58	X66GPU-P3P	O
59	GND	-	60	BGVSNS-B1P	I
61	LVDSSEN-B3N	O	62	AGPBSY-P3N	I

Table C-1 VGA board (FQDVG*) I/F connector pin assignments (200-pin) (2/3)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
63	PNL2-P3P	I	64	PIRQG-P3N	I
65	GND	-	66	PNL0-P3P	I
67	PNL1-P3P	I	68	STPAGP-S3N	O
69	RSTVGA-B3N	O	70	PDNVGA-B3N	O
71	GND	-	72	GND	-
73	GND	-	74	GND	-
75	GND	-	76	FLTEN-B3N	O
77	NC	-	78	NC	-
79	B5V	O	80	NC	-
81	E5V	O	82	GPON-E3P	O
83	GND	-	84	GND	-
85	GND	-	86	GND	-
87	GND	-	88	GND	-
89	NC	-	90	P3V	O
91	P3V	O	92	P3V	O
93	P3V	O	94	NC	-
95	GND	-	96	GND	-
97	GND	-	98	GND	-
99	GND	-	100	GND	-
101	GND	-	102	GND	-
103	GND	-	104	AGTRDY-PQN	I/O
105	AGSTOP-PQN	I/O	106	GND	-
107	AGFRAM-PQN	I/O	108	AGPAR-PQP	I/O
109	AGIRDY-PQN	I/O	110	AGDVSL-PQN	I/O
111	GND	-	112	AGAD16-PQP	I/O
113	AGAD17-PQP	I/O	114	AGAD18-PQP	I/O
115	AGAD19-PQP	I/O	116	GND	-
117	AGAD20-PQP	I/O	118	AGAD21-PQP	I/O
119	AGAD22-PQP	I/O	120	AGAD23-PQP	I/O
121	AGCBE2-PQN	I/O	122	AGCBE3-PQN	I/O
123	GND	-	124	ADSTB1-PQP	I/O
125	ADSTB1-PQN	I/O	126	GND	-
127	AGAD24-PQP	I/O	128	AGAD25-PQP	I/O
129	AGAD26-PQP	I/O	130	AGAD27-PQP	I/O
131	GND	-	132	AGAD28-PQP	I/O
133	AGAD29-PQP	I/O	134	AGAD30-PQP	I/O
135	AGAD31-PQP	I/O	136	GND	-

Table C-1 VGA board (FQDVG*) I/F connector pin assignments (200-pin) (3/3)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
137	NC	-	138	AV-PXP	I
139	NC	-	140	GND	-
141	CRTBLU-PXP	I	142	GND	-
143	CRTGRN-PXP	I	144	GND	-
145	CRTRED-PXP	I	146	GND	-
147	DBLUE-PXP	I	148	GND	-
149	DGRN-PXP	I	150	GND	-
151	DRED-PXP	I	152	GND	-
153	HSYNC-B3P	I/O	154	OVSYNC-B3P	I/O
155	GND	-	156	BRT0-P5P	O
157	BRT1-P5P	O	158	BRT2DA-S3P	O
159	1R5-P1V	O	160	1R5-P1V	O
161	1R5-P1V	O	162	1R5-P1V	O
163	FLON-S3N	O	164	BVON-S5P	O
165	GND	-	166	BVON-S5N	O
167	2R5SNS-B2P	I	168	P5V	O
169	P5V	O	170	P5V	O
171	P5V	O	172	DDCSCL-P5P	I/O
173	DDCSDA-P5P	I/O	174	DPCONF-S5P	O
175	GND	-	176	GND	-
177	GND	-	178	GND	-
179	GND	-	180	PVON-S5P	O
181	15-EBV	O	182	NC	-
183	GND	-	184	GND	-
185	GND	-	186	NC	-
187	B3V	O	188	B3V	O
189	B3V	O	190	B3V	O
191	NC	-	192	GND	-
193	GND	-	194	GND	-
195	GND	-	196	NC	-
197	PVT-EFV	O	198	PVT-EFV	O
199	PVT-EFV	O	200	PVT-EFV	O

C.2 PJ117 Slim Select Bay I/F Connector (72-pin)*Table C-2 Slim Select Bay I/F connector pin assignments (72-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	GND	-	2	GND	-
3	CDAUDR-EXP	O	4	CDAUDL-EXP	O
5	GND	-	6	CD-GND	-
7	IDRSTB-E5N	O	8	GND	-
9	GND	-	10	SDD07-E5P	I/O
11	SDD08-E5P	I/O	12	SDD06-E5P	I/O
13	SDD09-E5P	I/O	14	SDD05-E5P	I/O
15	SDD10-E5P	I/O	16	GND	-
17	GND	-	18	SDD04-E5P	I/O
19	SDD11-E5P	I/O	20	SDD03-E5P	I/O
21	SDD12-E5P	I/O	22	SDD02-E5P	I/O
23	SDD13-E5P	I/O	24	SB-E5V	O
25	SB-E5V	O	26	SDD01-E5P	I/O
27	SDD14-E5P	I/O	28	SDD00-E5P	I/O
29	SDD15-E5P	I/O	30	GND	-
31	GND	-	32	SDDREQ-E5P	I
33	GND	-	34	SDIOW-E3N	O
35	GND	-	36	SDIOR-E3N	O
37	GND	-	38	SIORDY-E5P	I
39	NC	-	40	SDDACK-E3N	O
41	GND	-	42	IRQ15-E5P	I
43	NC	-	44	SDA1-E3P	O
45	SB-E5V	O	46	SB-E5V	O
47	SB-E5V	O	48	SDA0-E3P	O
49	SDA2-E3P	O	50	SDCS1-E3N	O
51	SDCS3-E3N	O	52	SDASP-E5N	I
53	GND	-	54	MBSTS2-S3N	I
55	MBSTS1-S3N	I	56	MBSTS0-S3N	I
57	GND	-	58	DBT20V-S5N	O
59	PSDA-S5P	I	60	BT2VD	O
61	PSCL-S5P	I	62	BTMP2-SXP	I
63	CDCHG2-S5P	O	64	GND	-
65	GND	-	66	USBP4-S3N	I/O
67	GND	-	68	USBP4-S3P	I/O
69	GND	-	70	GND	-
71	GND	-	72	PVBAT2	O

C.3 PJ123 Keyboard I/F Connector (34-pin)

Table C-3 Keyboard I/F connector pin assignments (34-pin)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	NUMLED-P5N	I	2	ARWLED-P5N	I
3	CAPLED-P5N	I	4	P5V	O
5	KBSC00-S3N	O	6	KBSC01-S3N	O
7	KBSC02-S3N	O	8	KBSC03-S3N	O
9	KBSC04-S3N	O	10	KBSC05-S3N	O
11	KBSC06-S3N	O	12	KBRT00-S3N	I
13	KBSC07-S3N	O	14	KBSC08-S3N	O
15	KBSC09-S3N	O	16	KBRT01-S3N	I
17	KBRT02-S3N	I	18	KBRT03-S3N	I
19	KBSC10-S3N	O	20	KBSC11-S3N	O
21	KBRT04-S3N	I	22	KBRT05-S3N	I
23	KBSC12-S3N	O	24	KBSC13-S3N	O
25	KBRT06-S3N	I	26	KBRT07-S3N	I
27	KBSC14-S3N	O	28	KBSC15-S3N	O
29	NC	-	30	SP-P5V	O
31	SPX-PXP	I	32	SP-GND	-
33	SPY-PXP	I	34	NC	-

C.4 PJ124 RJ-45 & RJ-11 I/F Connector (14-pin)

Table C-4 RJ-45 & RJ-11 I/F connector pin assignments (14-pin)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
A1	TX+	O	A2	TX-	O
A3	RX+	I	A4	NC	-
A5	NC	-	A6	RX-	I
A7	NC	-	A8	NC	-
A9	LNK-E3N	I	A10	LAN-E3V	O
A11	ACT-E3N	I	A12	LAN-E3V	O
B1	MDMTIP-B3P	I/O	B2	MDMRNG-B3P	I/O

C.5 PJ326 Debug Port I/F Connector (4-pin) (Not mount)

Table C-5 Debug port I/F connector pin assignments (4-pin) (Not mount)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	B3V	O	2	DBGRX-B3P	
3	DBGTX		4	GND	-

C.6 PJ1001 SO-DIMM Socket Connector 0 (200-pin)*Table C-6 SO-DIMM socket connector 0 pin assignments (200-pin) (1/3)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	MR1R25-P1V	O	2	MR1R25-P1V	O
3	GND	-	4	GND	-
5	SDQ00R-B2P	I/O	6	SDQ06R-B2P	I/O
7	SDQ04R-B2P	I/O	8	SDQ01R-B2P	I/O
9	2R5-B2V	O	10	2R5-B2V	O
11	SDQS0R-B2P	I/O	12	GND	-
13	SDQ05R-B2P	I/O	14	SDQ02R-B2P	I/O
15	GND	-	16	GND	-
17	SDQ03R-B2P	I/O	18	SDQ07R-B2P	I/O
19	SDQ13R-B2P	I/O	20	SDQ12R-B2P	I/O
21	2R5-B2V	O	22	2R5-B2V	O
23	SDQ08R-B2P	I/O	24	SDQ09R-B2P	I/O
25	SDQS1R-B2P	I/O	26	GND	-
27	GND	-	28	GND	-
29	SDQ14R-B2P	I/O	30	SDQ11R-B2P	I/O
31	SDQ15R-B2P	I/O	32	SDQ10R-B2P	I/O
33	2R5-B2V	O	34	2R5-B2V	O
35	SCK0-B2P	O	36	2R5-B2V	O
37	SCK0-B2N	O	38	GND	-
39	GND	-	40	GND	-
41	SDQ20R-B2P	I/O	42	SDQ22R-B2P	I/O
43	SDQ16R-B2P	I/O	44	SDQ21R-B2P	I/O
45	2R5-B2V	O	46	2R5-B2V	O
47	SDQS2R-B2P	I/O	48	GND	-
49	SDQ17R-B2P	I/O	50	SDQ19R-B2P	I/O
51	GND	-	52	GND	-
53	SDQ18R-B2P	I/O	54	SDQ23R-B2P	I/O
55	SDQ25R-B2P	I/O	56	SDQ29R-B2P	I/O
57	2R5-B2V	O	58	2R5-B2V	O
59	SDQ24R-B2P	I/O	60	SDQ28R-B2P	I/O
61	SDQS3R-B2P	I/O	62	GND	-

Table C-6 SO-DIMM socket connector 0 pin assignments (200-pin) (2/3)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
63	GND	-	64	GND	-
65	SDQ26R-B2P	I/O	66	SDQ30R-B2P	I/O
67	SDQ27R-B2P	I/O	68	SDQ31R-B2P	I/O
69	2R5-B2V	O	70	2R5-B2V	O
71	SCB5A-B2P	I/O	72	SCB0A-B2P	I/O
73	SCB4A-B2P	I/O	74	SCB1A-B2P	I/O
75	GND	-	76	GND	-
77	SDQS8A-B2P	I/O	78	GND	-
79	SCB2A-B2P	I/O	80	SCB3A-B2P	I/O
81	2R5-B2V	O	82	2R5-B2V	O
83	SCB6A-B2P	I/O	84	SCB7A-B2P	I/O
85	NC	-	86	NC	-
87	GND	-	88	GND	-
89	2R5-B2V	O	90	GND	-
91	GND	-	92	2R5-B2V	O
93	2R5-B2V	O	94	2R5-B2V	O
95	SCKE1-B2P	O	96	SCKE0-B2P	O
97	NC	-	98	NC	-
99	SMA12R-B2P	O	100	SMA11R-B2P	O
101	SMA09R-B2P	O	102	SMA08R-B2P	O
103	GND	-	104	GND	-
105	SMA07R-B2P	O	106	SMA06R-B2P	O
107	SMA05R-B2P	O	108	SMA04R-B2P	O
109	SMA03R-B2P	O	110	SMA02R-B2P	O
111	SMA01R-B2P	O	112	SMA00R-B2P	O
113	2R5-B2V	O	114	2R5-B2V	O
115	SMA10R-B2P	O	116	SMS1R-B2P	O
117	SBS0R-B2P	O	118	SRASR-B2N	O
119	SWER-B2N	O	120	SCASR-B2N	O
121	SCS0-B2N	O	122	SCS1-B2N	O
123	NC	-	124	NC	-
125	GND	-	126	GND	-
127	SDQ37R-B2P	I/O	128	SDQ33R-B2P	I/O
129	SDQ36R-B2P	I/O	130	SDQ32R-B2P	I/O
131	2R5-B2V	O	132	2R5-B2V	O
133	SDQS4R-B2P	I/O	134	GND	-
135	SDQ34R-B2P	I/O	136	SDQ39R-B2P	I/O

Table C-6 SO-DIMM socket connector 0 pin assignments (200-pin) (3/3)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
137	GND	-	138	GND	-
139	SDQ38R-B2P	I/O	140	SDQ35R-B2P	I/O
141	SDQ44R-B2P	I/O	142	SDQ41R-B2P	I/O
143	2R5-B2V	O	144	2R5-B2V	O
145	SDQ45R-B2P	I/O	146	SDQ40R-B2P	I/O
147	SDQS5R-B2P	I/O	148	GND	-
149	GND	-	150	GND	-
151	SDQ46R-B2P	I/O	152	SDQ47R-B2P	I/O
153	SDQ42R-B2P	I/O	154	SDQ43R-B2P	I/O
155	2R5-B2V	O	156	2R5-B2V	O
157	2R5-B2V	O	158	SCK1-B2N	O
159	GND	-	160	SCK1-B2P	O
161	GND	-	162	GND	-
163	SDQ48R-B2P	I/O	164	SDQ54R-B2P	I/O
165	SDQ53R-B2P	I/O	166	SDQ49R-B2P	I/O
167	2R5-B2V	O	168	2R5-B2V	O
169	SDQS6R-B2P	I/O	170	GND	-
171	SDQ51R-B2P	I/O	172	SDQ50R-B2P	I/O
173	GND	-	174	GND	-
175	SDQ52R-B2P	I/O	176	SDQ55R-B2P	I/O
177	SDQ60R-B2P	I/O	178	SDQ57R-B2P	I/O
179	2R5-B2V	O	180	2R5-B2V	O
181	SDQ56R-B2P	I/O	182	SDQ61R-B2P	I/O
183	SDQS7R-B2P	I/O	184	GND	-
185	GND	-	186	GND	-
187	SDQ58R-B2P	I/O	188	SDQ63R-B2P	I/O
189	SDQ59R-B2P	I/O	190	SDQ62R-B2P	I/O
191	2R5-B2V	O	192	2R5-B2V	O
193	SMBDAT-P3P	I/O	194	GND	-
195	SMBCLK-P3P	O	196	GND	-
197	P3V	O	198	GND	-
199	NC	-	200	NC	-

C.7 PJ1002 SO-DIMM Socket Connector 1 (200-pin)*Table C-7 SO-DIMM socket connector 1 pin assignments (200-pin) (1/3)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	MR1R25-P1V	O	2	MR1R25-P1V	O
3	GND	-	4	GND	-
5	SDQ00R-B2P	I/O	6	SDQ06R-B2P	I/O
7	SDQ04R-B2P	I/O	8	SDQ01R-B2P	I/O
9	2R5-B2V	O	10	2R5-B2V	O
11	SDQS0R-B2P	I/O	12	GND	-
13	SDQ05R-B2P	I/O	14	SDQ02R-B2P	I/O
15	GND	-	16	GND	-
17	SDQ03R-B2P	I/O	18	SDQ07R-B2P	I/O
19	SDQ13R-B2P	I/O	20	SDQ12R-B2P	I/O
21	2R5-B2V	O	22	2R5-B2V	O
23	SDQ08R-B2P	I/O	24	SDQ09R-B2P	I/O
25	SDQS1R-B2P	I/O	26	GND	-
27	GND	-	28	GND	-
29	SDQ14R-B2P	I/O	30	SDQ11R-B2P	I/O
31	SDQ15R-B2P	I/O	32	SDQ10R-B2P	I/O
33	2R5-B2V	O	34	2R5-B2V	O
35	SCK3-B2P	O	36	2R5-B2V	O
37	SCK3-B2N	O	38	GND	-
39	GND	-	40	GND	-
41	SDQ20R-B2P	I/O	42	SDQ22R-B2P	I/O
43	SDQ16R-B2P	I/O	44	SDQ21R-B2P	I/O
45	2R5-B2V	O	46	2R5-B2V	O
47	SDQS2R-B2P	I/O	48	GND	-
49	SDQ17R-B2P	I/O	50	SDQ19R-B2P	I/O
51	GND	-	52	GND	-
53	SDQ18R-B2P	I/O	54	SDQ23R-B2P	I/O
55	SDQ25R-B2P	I/O	56	SDQ29R-B2P	I/O
57	2R5-B2V	O	58	2R5-B2V	O
59	SDQ24R-B2P	I/O	60	SDQ28R-B2P	I/O
61	SDQS3R-B2P	I/O	62	GND	-

Table C-7 SO-DIMM socket connector 1 pin assignments (200-pin) (2/3)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
63	GND	-	64	GND	-
65	SDQ26R-B2P	I/O	66	SDQ30R-B2P	I/O
67	SDQ27R-B2P	I/O	68	SDQ31R-B2P	I/O
69	2R5-B2V	O	70	2R5-B2V	O
71	SCB5B-B2P	I/O	72	SCB0B-B2P	I/O
73	SCB4B-B2P	I/O	74	SCB1B-B2P	I/O
75	GND	-	76	GND	-
77	SDQS8B-B2P	I/O	78	GND	-
79	SCB2B-B2P	I/O	80	SCB3B-B2P	I/O
81	2R5-B2V	O	82	2R5-B2V	O
83	SCB6B-B2P	I/O	84	SCB7B-B2P	I/O
85	NC	-	86	NC	-
87	GND	-	88	GND	-
89	2R5-B2V	O	90	GND	-
91	GND	-	92	2R5-B2V	O
93	2R5-B2V	O	94	2R5-B2V	O
95	SCKE3-B2P	O	96	SCKE2-B2P	O
97	NC	-	98	NC	-
99	SMA12-B2P	O	100	SMA11-B2P	O
101	SMA09-B2P	O	102	SMA08-B2P	O
103	GND	-	104	GND	-
105	SMA07-B2P	O	106	SMA06-B2P	O
107	SMA05-B2P	O	108	SMA04-B2P	O
109	SMA03-B2P	O	110	SMA02-B2P	O
111	SMA01-B2P	O	112	SMA00-B2P	O
113	2R5-B2V	O	114	2R5-B2V	O
115	SMA10-B2P	O	116	SBS1-B2P	O
117	SBS0-B2P	O	118	SRAS-B2N	O
119	SWE-B2N	O	120	SCAS-B2N	O
121	SCS2-B2N	O	122	SCS3-B2N	O
123	NC	-	124	NC	-
125	GND	-	126	GND	-
127	SDQ37R-B2P	I/O	128	SDQ33R-B2P	I/O
129	SDQ36R-B2P	I/O	130	SDQ32R-B2P	I/O
131	2R5-B2V	O	132	2R5-B2V	O
133	SDQS4R-B2P	I/O	134	GND	-
135	SDQ34R-B2P	I/O	136	SDQ39R-B2P	I/O

Table C-7 SO-DIMM socket connector 1 pin assignments (200-pin) (3/3)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
137	GND	-	138	GND	-
139	SDQ38R-B2P	I/O	140	SDQ35R-B2P	I/O
141	SDQ44R-B2P	I/O	142	SDQ41R-B2P	I/O
143	2R5-B2V	O	144	2R5-B2V	O
145	SDQ45R-B2P	I/O	146	SDQ40R-B2P	I/O
147	SDQS5R-B2P	I/O	148	GND	-
149	GND	-	150	GND	-
151	SDQ46R-B2P	I/O	152	SDQ47R-B2P	I/O
153	SDQ42R-B2P	I/O	154	SDQ43R-B2P	I/O
155	2R5-B2V	O	156	2R5-B2V	O
157	2R5-B2V	O	158	SCK4-B2N	O
159	GND	-	160	SCK4-B2P	O
161	GND	-	162	GND	-
163	SDQ48R-B2P	I/O	164	SDQ54R-B2P	I/O
165	SDQ53R-B2P	I/O	166	SDQ49R-B2P	I/O
167	2R5-B2V	O	168	2R5-B2V	O
169	SDQS6R-B2P	I/O	170	GND	-
171	SDQ51R-B2P	I/O	172	SDQ50R-B2P	I/O
173	GND	-	174	GND	-
175	SDQ52R-B2P	I/O	176	SDQ55R-B2P	I/O
177	SDQ60R-B2P	I/O	178	SDQ57R-B2P	I/O
179	2R5-B2V	O	180	2R5-B2V	O
181	SDQ56R-B2P	I/O	182	SDQ61R-B2P	I/O
183	SDQS7R-B2P	I/O	184	GND	-
185	GND	-	186	GND	-
187	SDQ58R-B2P	I/O	188	SDQ63R-B2P	I/O
189	SDQ59R-B2P	I/O	190	SDQ62R-B2P	I/O
191	2R5-B2V	O	192	2R5-B2V	O
193	SMBDAT-P3P	I/O	194	P3V	O
195	SMBCLK-P3P	O	196	GND	-
197	P3V	O	198	GND	-
199	NC	-	200	NC	-

C.8 PJ1016 RGB I/F Connector (15-pin)*Table C-8 RGB interface connector pin assignments (15-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	CRTRED-PXP	O	2	CRTGRN-PXP	O
3	CRTBLU-PXP	O	4	NC	-
5	GND	-	6	GND	-
7	GND	-	8	GND	-
9	P5V	O	10	GND	-
11	NC	-	12	DDCSDA-P5P	I/O
13	HSYNC-B3P	I/O	14	OVSYNC-B3P	I/O
15	DDCSCL-P5P	I/O			

C.9 PJ1509 HDD I/F Connector (44-pin)*Table C-9 HDD I/F connector pin assignments (44-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	IDRSTA-P5N	O	2	GND	-
3	PDD07-P3P	I/O	4	PDD08-P3P	I/O
5	PDD06-P3P	I/O	6	PDD09-P3P	I/O
7	PDD05-P3P	I/O	8	PDD10-P3P	I/O
9	PDD04-P3P	I/O	10	PDD11-P3P	I/O
11	PDD03-P3P	I/O	12	PDD12-P3P	I/O
13	PDD02-P3P	I/O	14	PDD13-P3P	I/O
15	PDD01-P3P	I/O	16	PDD14-P3P	I/O
17	PDD00-P3P	I/O	18	PDD15-P3P	I/O
19	GND	-	20	NC	-
21	PDDREQ-P3P	I	22	GND	-
23	PDIOW-P3N	O	24	GND	-
25	PDIOR-P3N	O	26	GND	-
27	PIORDY-P3P	I	28	NC	-
29	PDDACK-P3N	O	30	GND	-
31	IRQ14-P3P	I	32	NC	-
33	PDA1-P3P	O	34	NC	-
35	PDA0-P3P	O	36	PDA2-P3P	O
37	PDCS1-P3N	O	38	PDCS3-P3N	O
39	HDDLED-P5N	I	40	GND	-
41	P5V	O	42	P5V	O
43	GND	-	44	NC	-

C.10 PJ1512 PC Card I/F Connector (150-pin)*Table C-10 PC Card I/F connector pin assignments (150-pin) (1/2)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	GND	-	2	GND	-
3	BCCD1-B3N	I	4	BCAD00-BYP	I/O
5	BCAD02-BYP	I/O	6	BCAD01-BYP	I/O
7	BCAD04-BYP	I/O	8	BCAD03-BYP	I/O
9	GND	-	10	BCAD06-BYP	I/O
11	BCAD05-BYP	I/O	12	BCD14-BYP	I/O
13	BCAD07-BYP	I/O	14	BCAD08-BYP	I/O
15	BCCBE0-BYN	I/O	16	BCAD10-BYP	I/O
17	GND	-	18	BCAD09-BYP	I/O
19	BCVS1-B3P	I/O	20	BCAD11-BYP	I/O
21	BCAD13-BYP	I/O	22	BCAD12-BYP	I/O
23	BCAD15-BYP	I/O	24	BCAD14-BYP	I/O
25	GND	-	26	BCAD16-BYP	I/O
27	BCCBE1-BYN	I/O	28	BCA18-BYP	I/O
29	BCPAR-BYP	I/O	30	BCLOCK-BYN	I/O
31	BCPERR-BYN	I/O	32	BCSTOP-BYN	I/O
33	GND	-	34	BCGNT-BYN	I/O
35	BCDEVS-BYN	I/O	36	BCINT-BYN	I
37	MCVCCB-BYV	O	38	MCVCCB-BYV	O
39	MCVPPB-BYV	O	40	BCCLK-BYP	O
41	BCTRDY-BYN	I/O	42	BCIRDY-BYN	I/O
43	GND	-	44	BCFRAM-BYN	I/O
45	BCCBE2-BYN	I/O	46	BCAD17-BYP	I/O
47	BCAD18-BYP	I/O	48	BCAD19-BYP	I/O
49	BCAD20-BYP	I/O	50	BCVS2-B3P	I/O
51	GND	-	52	BCAD21-BYP	I/O
53	BCRST-BYN	O	54	BCAD22-BYP	I/O
55	BCSERR-BYN	I/O	56	BCAD23-BYP	I/O
57	BCREQ-BYN	I	58	BCAD24-BYP	I/O
59	GND	-	60	BCCBE3-BYN	I/O
61	BCAD25-BYP	I/O	62	BCAUDI-BYP	I
63	BCAD26-BYP	I/O	64	BCSTSC-BYP	I
65	BCAD27-BYP	I/O	66	BCAD28-BYP	I/O
67	GND	-	68	BCAD29-BYP	I/O
69	BCAD30-BYP	I/O	70	BCD02-BYP	I/O
71	BCAD31-BYP	I/O	72	BCCLKR-BYN	I/O
73	BCCD2-B3N	I	74	GND	-
75	GND	-	76	GND	-

Table C-10 PC Card I/F connector pin assignments (150-pin) (2/2)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
77	GND	-	78	ACCD1-B3N	I
79	ACAD00-BYP	I/O	80	ACAD02-BYP	I/O
81	ACAD01-BYP	I/O	82	ACAD04-BYP	I/O
83	ACAD03-BYP	I/O	84	GND	-
85	ACAD06-BYP	I/O	86	ACAD05-BYP	I/O
87	ACD14-BYP	I/O	88	ACAD07-BYP	I/O
89	ACAD08-BYP	I/O	90	ACCBE0-BYN	I/O
91	ACAD10-BYP	I/O	92	GND	-
93	ACAD09-BYP	I/O	94	ACVS1-B3P	I/O
95	ACAD11-BYP	I/O	96	ACAD13-BYP	I/O
97	ACAD12-BYP	I/O	98	ACAD15-BYP	I/O
99	ACAD14-BYP	I/O	100	GND	-
101	ACAD16-BYP	I/O	102	ACCBE1-BYN	I/O
103	ACA18-BYP	I/O	104	ACPAR-BYP	I/O
105	ACLOCK-BYN	I/O	106	ACPERR-BYN	I/O
107	ACSTOP-BYN	I/O	108	GND	-
109	ACGNT-BYN	O	110	ACDEVS-BYN	I/O
111	ACINT-BYN	I	112	MCVCCA-BYV	O
113	MCVCCA-BYV	O	114	MCVPPA-BYV	O
115	ACCLK-BYP	O	116	ACTRDY-BYN	I/O
117	ACIRDY-BYN	I/O	118	GND	-
119	ACFRAM-BYN	I/O	120	ACCBE2-BYN	I/O
121	ACAD17-BYP	I/O	122	ACAD18-BYP	I/O
123	ACAD19-BYP	I/O	124	ACAD20-BYP	I/O
125	ACVS2-B3P	I/O	126	GND	-
127	ACAD21-BYP	I/O	128	ACRST-BYN	O
129	ACAD22-BYP	I/O	130	ACSERR-BYN	I/O
131	ACAD23-BYP	I/O	132	ACREQ-BYN	I
133	ACAD24-BYP	I/O	134	GND	-
135	ACCBE3-BYN	I/O	136	ACAD25-BYP	I/O
137	ACAUDI-BYP	I	138	ACAD26-BYP	I/O
139	ACSTSC-BYP	I	140	ACAD27-BYP	I/O
141	ACAD28-BYP	I/O	142	GND	-
143	ACAD29-BYP	I/O	144	ACAD30-BYP	I/O
145	ACD02-BYP	I/O	146	ACAD31-BYP	I/O
147	ACCLKR-BYN	I/O	148	ACCD2-B3N	I
149	GND	-	150	GND	-

C.11 PJ2003 Touch Pad I/F Connector (8-pin)*Table C-11 Touch Pad I/F connector pin assignments (8-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	P5V	O	2	IPDDAT-P5P	
3	IPDCLK-P5P		4	GND	-
5	SP-GND		6	SPY-PXP	
7	SPX-PXP		8	SP-P5V	

C.12 PJ2007 Docking I/F Connector (242-pin)*Table C-12 Docking I/F connector pin assignments (242-pin) (1/4)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	DCOUT	-	2	DCOUT	-
3	DOCDT1-S3N	I	4	P5V	-
5	MOUSCK-P5P	I/O	6	EXKBCK-P5P	I/O
7	GND	-	8	PHYRST-E3N	O
9	DPCONF-S5P	I	10	GND	-
11	GND	-	12	DDCSCL-P5P	I/O
13	DRED-PXP	O	14	DGRN-PXP	O
15	DBLUE-PXP	I/O	16	OVSYNCP3P	O
17	NC	-	18	NC	-
19	GND	-	20	NC	-
21	NC	-	22	NC	-
23	NC	-	24	NC	-
25	NC	-	26	NC	-
27	NC	-	28	GND	-
29	GND	-	30	NC	-
31	NC	-	32	NC	-
33	NC	-	34	NC	-
35	NC	-	36	NC	-
37	GND	-	38	NC	-
39	NC	-	40	NC	-
41	GND	-	42	NC	-
43	NC	-	44	NC	-
45	GND	-	46	NC	-
47	NC	-	48	NC	-
49	GND	-	50	NC	-
51	NC	-	52	NC	-

Table C-12 Docking I/F connector pin assignments (242-pin) (2/4)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
53	GND	-	54	NC	-
55	NC	-	56	NC	-
57	NC	-	58	NC	-
59	MDMRNG-B3P	I/O	60	MDMTIP-B3P	I/O
61	DCOUT	-	62	DCOUT	-
63	EJCTRQ-S3N	I/O	64	IF-P5V	-
65	MOUSDT-P5P	I/O	66	EXKBDT-P5P	I/O
67	GND	-	68	GND	-
69	DILSON-E3P	O	70	NC	-
71	GND	-	72	DDCSDA-P5P	I/O
73	GND	-	74	GND	-
75	GND	-	76	HSYNC-P3P	O
77	NC	-	78	NC	-
79	GND	-	80	NC	-
81	NC	-	82	NC	-
83	NC	-	84	NC	-
85	NC	-	86	NC	-
87	NC	-	88	GND	-
89	GND	-	90	NC	-
91	NC	-	92	NC	-
93	NC	-	94	NC	-
95	NC	-	96	NC	-
97	GND	-	98	NC	-
99	NC	-	100	NC	-
101	GND	-	102	NC	-
103	NC	-	104	NC	-
105	GND	-	106	NC	-
107	NC	-	108	NC	-
109	GND	-	110	NC	-
111	NC	-	112	NC	-
113	GND	-	114	NC	-
115	NC	-	116	NC	-
117	NC	-	118	NC	-
119	NC	-	120	NC	-
121	DCOUT	-	122	DCOUT	-
123	DSSCL-S5P	I/O	124	IF-P5V	-
125	S5V	-	126	DTPA-B3P	I/O

Table C-12 Docking I/F connector pin assignments (242-pin) (3/4)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
127	GND	-	128	DTPB-B3P	I/O
129	UBON1D-E5N	O	130	UBOC1D-S3N	O
131	GND	-	132	UBON2D-E5N	O
133	UBOC2D-S3N	O	134	SNDMUT-S3N	O
135	NC	-	136	DOU TL-PXP	O
137	DINL-PXP	-	138	DINR-PXN	I
139	GND	-	140	PWRSW-S3N	I
141	DCD-PYP	I	142	DSR-PYP	I
143	TXD-PYN	O	144	RING-BYP	I
145	PE-P5P	I	146	PDB07-P5P	I/O
147	PDB06-P5P	I/O	148	GND	-
149	GND	-	150	PDB04-P5P	I/O
151	PDB01-P5P	I/O	152	PDB02-P5P	I/O
153	PDB00-P5P	I/O	154	STR0B-P5N	O
155	NC	-	156	NC	-
157	GND	-	158	NC	-
159	NC	-	160	NC	-
161	GND	-	162	NC	-
163	NC	-	164	NC	-
165	GND	-	166	NC	-
167	NC	-	168	NC	-
169	GND	-	170	NC	-
171	NC	-	172	NC	-
173	GND	-	174	NC	-
175	LAN-E3V	-	176	NC	-
177	NC	-	178	TERMPL-GND	-
179	TXP-EXP	O	180	TXN-EXN	O
181	DCOUT	-	182	DCOUT	-
183	DSSDA-S5P	I/O	184	IF-P5V	-
185	NC	-	186	DTPA-B3N	I/O
187	GND	-	188	DTPB-B3N	I/O
189	USBP2D-S3P	I/O	190	USBP2D-S3N	I/O
191	GND	-	192	USBP3D-S3P	I/O
193	USBP3D-S3N	I/O	194	DOU TR-PXP	O
195	DOU TR-PXN	O	196	DOU TL-PXN	O
197	DINL-PXN	I	198	DINR-PXP	I
199	GND	-	200	RXD-PYN	I

Table C-12 Docking I/F connector pin assignments (242-pin) (4/4)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
201	RTS-PYP	O	202	CTS-PYP	I
203	DTR-PYP	O	204	SELCT-P5P	I
205	BUSY-P5P	I	206	ACK-P5N	I
207	PDB05-P5P	I/O	208	GND	-
209	GND	-	210	PDB03-P5P	I/O
211	SLIN-P5N	I/O	212	PINIT-P5N	O
213	ERROR-P5N	I	214	AUTFD-P5N	O
215	NC	-	216	NC	-
217	GND	-	218	NC	-
219	NC	-	220	NC	-
221	GND	-	222	NC	-
223	NC	-	224	NC	-
225	GND	-	226	NC	-
227	NC	-	228	NC	-
229	GND	-	230	NC	-
231	NC	-	232	NC	-
233	GND	-	234	ACT-E3N	I
235	LNK-E3N	I	236	DOCDT2-S3N	I
237	NC	-	238	NC	-
239	RXP-EXP	I	240	RXN-EXN	I
A1	DSKDC	-	A2	GND	-

C.13 PJ2015 Mini PCI Card I/F Connector (124-pin)

Table C-13 Mini PCI card I/F connector pin assignments (124-pin) (1/2)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	NC	-	2	NC	-
3	NC	-	4	NC	-
5	NC	-	6	NC	-
7	NC	-	8	NC	-
9	NC	-	10	NC	-
11	NC	-	12	NC	-
13	WLON-S3N	I	14	NC	-
15	GND	-	16	NC	-
17	PIRQA-P3N	I	18	P5V	O
19	P3V	O	20	PIRQD-P3N	O
21	NC	-	22	NC	-
23	GND	-	24	B3V	-
25	X33MPC-P3P	I	26	PCIRST-S3N	O
27	GND	-	28	P3V	O
29	PREQ2-P3N	I	30	PGNT2-P3N	O
31	P3V	-	32	GND	-
33	AD31-P3P	I	34	PME-S3N	O
35	AD29-P3P	I	36	NC	-
37	GND	-	38	AD30-P3P	O
39	AD27-P3P	I	40	P3V	O
41	AD25-P3P	I	42	AD28-P3P	O
43	NC	-	44	AD26-P3P	O
45	CBE3-P3N	I	46	AD24-P3P	O
47	AD23-P3P	I	48	AD26-P3P	O
49	GND	-	50	GND	-
51	AD21-P3P	I	52	AD22-P3P	O
53	AD19-P3P	I	54	AD20-P3P	O
55	GND	-	56	PAR-P3P	O
57	AD17-P3P	I	58	AD18-P3P	O
59	CBE2-P3N	I	60	AD16-P3P	O
61	IRDY-P3N	I	62	GND	-
63	P3V	O	64	FRAME-P3N	O
65	CLKRUN-P3N	I	66	TRDY-P3N	O
67	SERR-P3N	I	68	STOP-P3N	O
69	GND	-	70	P3V	-
71	PERR-P3N	I	72	DEVSEL-P3N	O

Table C-13 Mini PCI I/F card connector pin assignments (124-pin) (2/2)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
73	CBE1-P3N	I	74	GND	-
75	AD14-P3P	I	76	AD15-P3P	O
77	GND	-	78	AD13-P3P	O
79	AD12-P3P	I	80	AD11-P3P	O
81	AD10-P3P	I	82	GND	-
83	GND	-	84	AD09-P3P	O
85	AD08-P3P	I	86	CBE0-P3N	O
87	AD07-P3P	I	88	P3V	O
89	P3V	O	90	AD06-P3P	O
91	AD05-P3P	I	92	AD04-P3P	O
93	NC	-	94	AD02-P3P	O
95	AD03-P3P	I	96	AD00-P3P	O
97	P5V	O	98	NC	-
99	AD01-P3P	I	100	NC	-
101	GND	-	102	GND	-
103	NC	-	104	GND	-
105	NC	-	106	NC	-
107	NC	-	108	NC	-
109	NC	-	110	NC	-
111	NC	-	112	NC	-
113	GND	-	114	GND	-
115	NC	-	116	NC	-
117	GND	-	118	NC	-
119	GND	-	120	GND	-
121	NC	-	122	NC	-
123	NC	-	124	B3V	O

C.14 PJ2017 MDC I/F Connector (30-pin)*Table C-14 MDC I/F connector pin assignments (30-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	NC	-	2	GND	-
3	GND	-	4	PHONE-BXN	O
5	NC	-	6	NC	-
7	NC	-	8	GND	-
9	NC	-	10	NC	-
11	NC	-	12	NC	-
13	NC	-	14	NC	-
15	GND	-	16	MDC-B3V	O
17	MDC-B3V	O	18	NC	-
19	GND	-	20	GND	-
21	NC	-	22	M97SY2-P3P	O
23	M97OT2-P3P	O	24	NC	-
25	-M97RS2-S3N	O	26	M97IN2-B3P	I
27	GND	-	28	GND	-
29	GND	-	30	X97BMD-P3P	I/O

C.15 PJ2018 Modem Cable I/F Connector (2-pin)*Table C-15 Modem Cable I/F connector pin assignments (2-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	MDMTIP-B3P	I/O	2	MDMRNG-B3P	I/O

C.16 PJ2020 Parallel I/F Connector (25-pin)*Table C-16 Parallel I/F connector pin assignments (25-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	STROB-P5N	I	2	PDB00-P5P	I/O
3	PDB01-P5P	I/O	4	PDB02-P5P	I/O
5	PDB03-P5P	I/O	6	PDB04-P5P	I/O
7	PDB05-P5P	I/O	8	PDB06-P5P	I/O
9	PDB07-P5P	O	10	ACK-P5N	O
11	BUSY-P5P	O	12	PE-P5P	O
13	SELCT-P5P	O	14	AUTFD-P5N	I
15	ERROR-P5N	I	16	PINIT-P5N	I
17	SLIN-P5N	-	18	GND	-
19	GND	-	20	GND	-
21	GND	-	22	GND	-
23	GND	-	24	GND	-
25	GND	-			

C.17 PJ2025 Switch Board (FQDSQ*) I/F Connector (14-pin)*Table C-17 Switch board (FQDSQ*) I/F connector pin assignments (14-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	KBRT02-S3N	I	2	KBRT00-S3N	I
3	KBRT01-S3N	I	4	KBSC16-S3N	O
5	PNLOFF-S3N	I	6	CDNEXT-S5N	I
7	CDSTOP-S5N	I	8	CDPLAY-S5N	I
9	GND	-	10	CDPREV-S5N	I
11	MP3BTN-S3N	I	12	CDBTN-S3N	I
13	GND	-	14	PWRSW-S3N	I

C.18 PJ2040 USB Board (FQDUB*) I/F Connector (30-pin)*Table C-18 USB Board (FQDUB*) I/F connector pin assignments (30-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	E5V	O	2	E5V	O
3	E5V	O	4	E5V	O
5	E5V	O	6	E5V	O
7	E5V	O	8	E5V	O
9	NC	-	10	USBOC1-E3N	I
11	USBON1-E5N	O	12	GND	-
13	USBOC0-E3N	I	14	USBON0-E5N	O
15	GND	-	16	GND	-
17	GND	-	18	USBP3-S3P	I/O
19	USBP3-S3N	I/O	20	GND	-
21	USBP2-S3P	I/O	22	USBP2-S3N	I/O
23	GND	-	24	USBP1-S3P	I/O
25	USBP1-S3N	I/O	26	GND	-
27	USBP0-S3P	I/O	28	USBP0-S3N	I/O
29	GND	-	30	GND	-

C.19 PJ4015 Video Out I/F Connector (2-pin)*Table C-19 Video out I/F connector pin assignments (2-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	GND	-	2	AV-PXP	O

C.20 PJ4900 Bluetooth I/F Connector (20-pin)*Table C-20 Bluetooth I/F connector pin assignments (20-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	BT-P3V	O	2	NC	-
3	NC	-	4	USBP5-S3N	I/O
5	USBP5-S3P	I/O	6	NC	-
7	NC	-	8	-BTIFOF-S3N	O
9	NC	-	10	GND	-
11	NC	-	12	NC	-
13	BTRST-S3P	O	14	NC	-
15	NC	-	16	NC	-
17	NC	-	18	BTMDL-P3N	I
19	NC	-	20	GND	-

C.21 PJ5004 Right Speaker I/F Connector (2-pin)*Table C-21 Right speaker I/F connector pin assignments (2-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	SPKOTR-EXP	O	2	SPKOTR-EXN	O

C.22 PJ5005 Left Speaker I/F Connector (3-pin)*Table C-22 Left speaker I/F connector pin assignments (3-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	SPKOTL-EXP	O	2	NC	-
3	SPKOTL-EXN	O			

C.23 PJ5006 Sound Board (FQDSD*) I/F Connector (60-pin)*Table C-23 Sound board (FQDSD*) I/F connector pin assignments (60-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	CDAUDL-EXP	O	2	CD-GND	-
3	CDAUDR-EXP	O	4	CD-GND	-
5	DINL-PXN	O	6	DINL-PXP	O
7	DINR-PXP	O	8	DINR-PXN	O
9	GND	-	10	X97BCK-P3P	I
11	GND	-	12	M97SY1-P3P	O
13	M97RS1-S3N	O	14	GND	-
15	M97OT1-P3P	O	16	M97IN1-P3P	I
17	GND	-	18	X14SND-P3P	O
19	GND	-	20	ATBEEP-B3P	O
21	PVON-S5P	O	22	NC	-
23	P3V	O	24	P3V	O
25	NC	-	26	SND-E5V	O
27	SND-E5V	O	28	SND-E5V	O
29	SND-E5V	O	30	SND-E5V	O
31	SND-GND	-	32	OZPVEN-S3N	O
33	SND-GND	-	34	PHONE-BXP	O
35	PHONE-BXN	O	36	SND-GND	-
37	DOU TL-PXN	I	38	DOU TL-PXP	I
39	SND-GND	-	40	DOU TR-PXN	I
41	DOU TR-PXP	I	42	SND-GND	-
43	SND MUT-S3N	O	44	AMP SD-S3N	O
45	SND-GND	-	46	CAUDIO-B3P	O
47	SND-GND	-	48	SPKOTR-EXP	I
49	SPKOTR-EXP	I	50	SPKOTR-EXN	I
51	SPKOTR-EXN	I	52	SPKOTL-EXP	I
53	SPKOTL-EXP	I	54	SPKOTL-EXN	I
55	SPKOTL-EXN	I	56	SND-GND	-
57	SND-GND	-	58	SND-GND	-
59	SND-GND	-	60	SND-GND	-

C.24 PJ6100 IEEE 1394 I/F Connector (4-pin)*Table C-24 IEEE 1394 I/F connector pin assignments (4-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	TPB0-P3N	I/O	2	TPB0-P3P	I/O
3	TPA0-P3N	I/O	4	TPA0-P3P	I/O

C.25 PJ8770 Cooling fan I/F Connector (3-pin)*Table C-25 Cooling fan I/F connector pin assignments (3-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	P5V	O	2	GND	-
3	FANG-P3P	I			

C.26 PJ8800 DC-IN I/F Connector (4-pin)*Table C-26 DC-IN I/F connector pin assignments (4-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	GND	-	2	GND	-
3	DC-IN	I	4	DC-IN	I

C.27 PJ8810 Battery I/F Connector (10-pin)*Table C-27 Battery I/F connector pin assignments (10-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	+		2	BTMP1	
3	DCHG		4	M5V	
5	PSCL-S5P		6	PSDA-S5P	
7	GND	-	8	DBT10V-S5N	
9	GND	-	10	GND	-

C.28 PJ9999 RTC Battery I/F Connector (2-pin)*Table C-28 RTC battery I/F connector pin assignments (2-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	R3V	I/O	2	GND	-

C.29 IS4004 SD Card I/F Connector (13-pin)*Table C-29 SD card I/F connector pin assignments (13-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	SDAT3-P3P	I/O	2	SDCMD-P3P	O
3	GND	-	4	SD-P3V	O
5	SDCLK-P3P	O	6	GND	-
7	SDAT0-P3P	I/O	8	SDAT1-P3P	I/O
9	SDAT2-P3P	I/O	10	SDCD-P3N	I
11	SDWP-P3P	I	12	GND	-
13	GND	-			

VGA Board (FQDVG*)

C.30 PJ4205 LCD I/F Connector (40-pin)

Table C-30 LCD I/F connector pin assignments (40-pin)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	GND	-	2	GND	-
3	GND	-	4	GND	-
5	TXDT6-P3P	O	6	GND	-
7	TXDT6-P3N	O	8	BRT2DA-S3P	O
9	TXDT5-P3P	O	10	PNL-P3V	O
11	TXDT5-P3N	O	12	PNL-P3V	O
13	TXDT4-P3P	O	14	BRT1-P5P	O
15	TXDT4-P3N	O	16	FL-P5V	O
17	TXCK1-P3P	O	18	FL-P5V	O
19	TXCK1-P3N	O	20	FL-P5V	O
21	GND	-	22	BRT0-P5P	O
23	TXDT2-P3P	O	24	GND	-
25	TXDT2-P3N	O	26	GND	-
27	TXDT1-P3P	O	28	GND	-
29	TXDT1-P3N	O	30	GND	-
31	TXDT0-P3P	O	32	GND	-
33	TXDT0-P3N	O	34	PNL2-P3P	I
35	TXCK0-P3P	O	36	PNL1-P3P	I
37	TXCK0-P3N	O	38	PNL0-P3P	I
39	GND	-	40	GND	-

C.31 PJ5500 System Board (FQDSY*) I/F Connector (200-pin)*Table C-31 System board (FQDSY*) I/F connector pin assignments (200-pin) (1/3)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	GND	-	2	GND	-
3	GND	-	4	AGAD00-PQP	I/O
5	AGAD01-PQP	I/O	6	GND	-
7	AGAD03-PQP	I/O	8	AGAD02-PQP	I/O
9	AGAD05-PQP	I/O	10	AGAD04-PQP	I/O
11	GND	-	12	AGAD06-PQP	I/O
13	AGAD07-PQP	I/O	14	AGAD08-PQP	I/O
15	AGAD09-PQP	I/O	16	GND	-
17	ADSTB0-PQP	I/O	18	ADSTB0-PQN	I/O
19	GND	-	20	AGAD10-PQP	I/O
21	AGAD11-PQP	I/O	22	AGAD12-PQP	I/O
23	AGAD14-PQP	I/O	24	AGAD13-PQP	I/O
25	AGAD15-PQP	I/O	26	GND	-
27	AGCBE0-PQN	I/O	28	AGCBE1-PQN	I/O
29	GND	-	30	NC	-
31	NC	-	32	NC	-
33	NC	-	34	NC	-
35	NC	-	36	GND	-
37	NC	-	38	NC	-
39	GND	-	40	NC	-
41	NC	-	42	GND	-
43	AGST2-PQP	I	44	AGGNT-PQN	I
45	AGST0-PQP	I	46	GND	-
47	AGREQ-PQN	O	48	AGST1-PQP	I
49	AGWBF-PQN	O	50	AGPIPE-PQN	O
51	AGRBF-PQN	O	52	GND	-
53	AGVRGC-PXP	O	54	GND	-
55	GND	-	56	AGVRGC-PXP	I
57	GND	-	58	X66GPU-P3P	I
59	GND	-	60	BGVSNS-B1P	O
61	NC	-	62	AGPBSY-P3N	O

Table C-31 System board (FQDSY*) I/F connector pin assignments (200-pin) (2/3)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
63	PNL2-P3P	O	64	PIRQG-P3N	O
65	GND	-	66	PNL0-P3P	O
67	PNL1-P3P	O	68	STPAGP-B3N	I
69	RSTVGA-B3N	I	70	PDNVGA-B3N	I
71	GND	-	72	GND	-
73	GND	-	74	GND	-
75	GND	-	76	NC	-
77	NC	-	78	NC	-
79	B5V	I	80	NC	-
81	E5V	I	82	NC	-
83	GND	-	84	GND	-
85	GND	-	86	GND	-
87	GND	-	88	GND	-
89	NC	-	90	P3V	I
91	P3V	I	92	P3V	I
93	P3V	I	94	NC	-
95	GND	-	96	GND	-
97	GND	-	98	GND	-
99	GND	-	100	GND	-
101	GND	-	102	GND	-
103	GND	-	104	AGTRDY-PQN	I/O
105	AGSTOP-PQN	I/O	106	GND	-
107	AGFRAM-PQN	I/O	108	AGPAR-PQP	I/O
109	AGIRDY-PQN	I/O	110	AGDVSL-PQN	I/O
111	GND	-	112	AGAD16-PQP	I/O
113	AGAD17-PQP	I/O	114	AGAD18-PQP	I/O
115	AGAD19-PQP	I/O	116	GND	-
117	AGAD20-PQP	I/O	118	AGAD21-PQP	I/O
119	AGAD22-PQP	I/O	120	AGAD23-PQP	I/O
121	AGCBE2-PQN	I/O	122	AGCBE3-PQN	I/O
123	GND	-	124	ADSTB1-PQP	I/O
125	ADSTB1-PQN	I/O	126	GND	-
127	AGAD24-PQP	I/O	128	AGAD25-PQP	I/O
129	AGAD26-PQP	I/O	130	AGAD27-PQP	I/O
131	GND	-	132	AGAD28-PQP	I/O
133	AGAD29-PQP	I/O	134	AGAD30-PQP	I/O
135	AGAD31-PQP	I/O	136	GND	-

Table C-31 System board (FQDSY*) I/F connector pin assignments (200-pin) (3/3)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
137	NC	-	138	AV-PXP	O
139	NC	-	140	GND	-
141	CRTBLU-PXP	O	142	GND	-
143	CRTGRN-PXP	O	144	GND	-
145	CRTRED-PXP	O	146	GND	-
147	DBLUE-PXP	O	148	GND	-
149	DGRN-PXP	O	150	GND	-
151	DRED-PXP	O	152	GND	-
153	HSYNC-B3P	I/O	154	OVSYNC-B3P	I/O
155	GND	-	156	BRT0-P5P	I
157	BRT1-P5P	I	158	BRT2DA-S3P	I
159	1R5-P1V	I	160	1R5-P1V	I
161	1R5-P1V	I	162	1R5-P1V	I
163	NC	-	164	BVON-S5P	I
165	GND	-	166	BVON-S5N	I
167	2R5SNS-B2P	O	168	P5V	I
169	P5V	I	170	P5V	I
171	P5V	I	172	DDCSCL-P5P	I/O
173	DDCSDA-P5P	I/O	174	DPCONF-S5P	I
175	GND	-	176	GND	-
177	GND	-	178	GND	-
179	GND	-	180	PVON-S5P	I
181	15-EBV	I	182	NC	-
183	GND	-	184	GND	-
185	GND	-	186	NC	-
187	B3V	I	188	B3V	I
189	B3V	I	190	B3V	I
191	NC	-	192	GND	-
193	GND	-	194	GND	-
195	GND	-	196	NC	-
197	PVT-EFV	I	198	PVT-EFV	I
199	PVT-EFV	I	200	PVT-EFV	I

Sound Board (FQDSD*)**C.32 PJ5000 External Microphone I/F Connector (6-pin)***Table C-32 External microphone I/F connector pin assignments (6-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	A-GND	-	2	EMIC-PXP	I
3	25VREF-P2V	O	4	A-GND	-
5	-EMICSL-P5P	I	6	25VREF-P2V	O

C.33 PJ5002 Internal Microphone I/F Connector (2-pin)*Table C-33 Internal microphone I/F connector pin assignments (2-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	IMIC-PXP	I/O	2	A-GND	-

C.34 PJ5003 Headphone I/F Connector (6-pin)*Table C-34 Headphone I/F connector pin assignments (6-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	A-GND	-	2	HEADL-EXP	O
3	HEADR-EXP	O	4	A-GND	-
5	SPKEN-E4P	I	6	NC	-

C.35 PJ5007 System Board (FQDSY*) I/F Connector (60-pin)*Table C-35 System board (FQDSY*) I/F connector pin assignments (60-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	CDAUDL-EXP	I	2	CD-GND	-
3	CDAUDR-EXP	I	4	CD-GND	-
5	DINL-PXN	I	6	DINL-PXP	I
7	DINR-PXP	I	8	DINR-PXN	I
9	GND	-	10	X97BCK-P3P	O
11	GND	-	12	M97SY1-P3P	I
13	M97RS1-S3N	I	14	GND	-
15	M97OT1-P3P	I	16	M97IN1-P3P	O
17	GND	-	18	X14SND-P3P	I
19	GND	-	20	ATBEEP-B3P	I
21	PVON-S5P	I	22	NC	-
23	P3V	I	24	P3V	I
25	NC	-	26	SND-E5V	I
27	SND-E5V	I	28	SND-E5V	I
29	SND-E5V	I	30	SND-E5V	I
31	SND-GND	-	32	OZPVEN-S3N	I
33	SND-GND	-	34	PHONE-BXP	I
35	PHONE-BXN	I	36	SND-GND	-
37	DOU TL-PXN	O	38	DOU TL-PXP	O
39	SND-GND	-	40	DOU TR-PXN	O
41	DOU TR-PXP	O	42	SND-GND	-
43	SNDMUT-S3N	I	44	AMPSD-S3N	I
45	SND-GND	-	46	CAUDIO-B3P	I
47	SND-GND	-	48	SPKOTR-EXP	O
49	SPKOTR-EXP	O	50	SPKOTR-EXN	O
51	SPKOTR-EXN	O	52	SPKOTL-EXP	O
53	SPKOTL-EXP	O	54	SPKOTL-EXN	O
55	SPKOTL-EXN	O	56	SND-GND	-
57	SND-GND	-	58	SND-GND	-
59	SND-GND	-	60	SND-GND	-

USB Board (FQDUB*)**C.36 PJ2033 USB I/F Connector (8-pin)***Table C-36 USB I/F connector pin assignments (8-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
A1	USB0PS-E5V	-	A2	USBP0-S3N	I/O
A3	USBP0-S3P	I/O	A4	GND	-
B1	USB0PS-E5V	-	B2	USBP1-S3N	I/O
B3	USBP1-S3P	I/O	B4	GND	-

C.37 PJ2042 System Board (FQDSY*) I/F Connector (30-pin)*Table C-37 System Board (FQDSY*) I/F connector pin assignments (30-pin)*

Pin No.	Signal name	I/O	Pin No	Signal Name	I/O
1	E5V	O	2	E5V	O
3	E5V	O	4	E5V	O
5	E5V	O	6	E5V	O
7	E5V	O	8	E5V	O
9	NC	-	10	USBOC1-E3N	O
11	USBON1-E5N	I	12	GND	-
13	USBOC0-E3N	O	14	USBON0-E5N	I
15	GND	-	16	GND	-
17	GND	-	18	USBP3-S3P	I/O
19	USBP3-S3N	I/O	20	GND	-
21	USBP2-S3P	I/O	22	USBP2-S3N	I/O
23	GND	-	24	USBP1-S3P	I/O
25	USBP1-S3N	I/O	26	GND	-
27	USBP0-S3P	I/O	28	USBP0-S3N	I/O
29	GND	-	30	GND	-

Appendix D Keyboard Scan/Character Codes

Table D-1 Scan codes (set 1 and set 2) (1/4)

Cap No.	Keytop	Code set 1		Code set 2			Note
		Make	Break	Make	Break		
01	' ~	29	A9	0E	F0	0E	
02	1 !	02	82	16	F0	16	
03	2 @	03	83	1E	F0	1E	
04	3 #	04	84	26	F0	26	
05	4 \$	05	85	25	F0	25	
06	5 %	06	86	2E	F0	2E	
07	6 ^	07	87	36	F0	36	
08	7 &	08	88	3D	F0	3D	*2
09	8 *	09	89	3E	F0	3E	*2
10	9 (0A	8A	46	F0	46	*2
11	0)	0B	8B	45	F0	45	
12	- _	0C	8C	4E	F0	4E	
13	= +	0D	8D	55	F0	55	
15	BkSp	0E	8E	66	F0	66	
16	Tab	0F	8F	0D	F0	0D	
17	Q	10	90	15	F0	15	
18	W	11	91	1D	F0	1D	
19	E	12	92	24	F0	24	
20	R	13	93	2D	F0	2D	
21	T	14	94	2C	F0	2C	
22	Y	15	95	35	F0	35	
23	U	16	96	3C	F0	3C	*2
24	I	17	97	43	F0	43	*2
25	O	13	98	44	F0	44	*2
26	P	19	99	4D	F0	4D	*2
27	[{	1A	9A	54	F0	54	
28] }	1B	9B	5B	F0	5B	

Table D-1 Scan codes (set 1 and set 2) (2/4)

Cap No.	Keytop	Code set 1		Code set 2		Note
		Make	Break	Make	Break	
29	\	2B	AB	5D	F0 5D	*5
30	Caps Lock	3A	BA	58	F0 58	
31	A	1E	9E	1C	F0 1C	
32	S	1F	9F	1B	F0 1B	
33	D	20	A0	23	F0 23	
34	F	21	A1	2B	F0 2B	
35	G	22	A2	34	F0 34	
36	H	23	A3	33	F0 33	
37	J	24	A4	3B	F0 3B	*2
38	K	25	A5	42	F0 42	*2
39	L	26	A6	4B	F0 4B	*2
40	; :	27	A7	4C	F0 4C	*2
41	' "	28	A8	52	F0 52	
43	Enter	1C	9C	5A	F0 5A	*3
44	Shift (L)	2A	AA	12	F0 12	
45	No.102 key	56	D6	61	F0 61	
46	Z	2C	AC	1A	F0 1A	
47	X	2D	AD	22	F0 22	
48	C	2E	AE	21	F0 21	
49	V	2F	AF	2A	F0 2A	
50	B	30	B0	32	F0 32	
51	N	31	B1	31	F0 31	
52	M	32	B2	3A	F0 3A	*2
53	, <	33	B3	41	F0 41	*2
54	. >	34	B4	49	F0 49	*2
55	/ ?	35	B5	4A	F0 4A	*2
57	Shift (R)	36	B6	59	F0 59	

Table D-1 Scan codes (set 1 and set 2) (3/4)

Cap No.	Keytop	Code set 1				Code set 2				Note
		Make		Break		Make		Break		
58	Ctrl	1D	9D	14	F0	14			*3	
60	Alt (L)	38	B8	11	F0	11			*3	
61	Space	39	B9	29	F0	29				
62	ALT (R)	E0 38	E0 B8	E0 11	E0 F0	11				
75	Ins	E0 52	E0 D2	E0 70	E0 F0	70			*1	
76	Del	E0 53	E0 D3	E0 71	E0 F0	71			*1	
79	←	E0 4B	E0 CB	E0 6B	E0 F0	6B			*1	
80	Home	E0 47	E0 C7	E0 6C	E0 F0	6C			*1	
81	End	E0 4F	E0 CF	E0 69	E0 F0	69			*1	
83	↑	E0 48	E0 C8	E0 75	E0 F0	75			*1	
84	↓	E0 50	E0 D0	E0 72	E0 F0	72			*1	
85	PgUp	E0 49	E0 C9	E0 7D	E0 F0	7D			*1	
86	PgDn	E0 51	E0 D1	E0 7A	E0 F0	7A			*1	
89	→	E0 4D	E0 CD	E0 74	E0 F0	74			*1	
110	Esc	01	81	76	F0	76				
112	F1	3B	BB	05	F0	05				
113	F2	3C	BC	06	F0	06				
114	F3	3D	BD	04	F0	04				
115	F4	3E	BE	0C	F0	0C				
116	F5	3F	BF	03	F0	03				
117	F6	40	C0	0B	F0	0B				
118	F7	41	C1	83	F0	83				
119	F8	42	C2	0A	F0	0A				
120	F9	43	C3	01	F0	01				
121	F10	44	C4	09	F0	09			*3	

Table D-1 Scan codes (set 1 and set 2) (4/4)

Cap No.	Keytop	Code set 1				Code set 2				Note
		Make		Break		Make		Break		
122	F11	57	D7	78	F0	78			*3	
123	F12	58	D8	07	F0	07			*3	
124	PrintSc	*6	*6	*6	*6				*6	
126	Pause	*7	*7	*7	*7				*7	
202	Fn	—	—	—	—				*4	
203	Win	E0	5B	E0	DB	E0	1F	E0	F0	1F
204	App	E0	5D	E0	DD	E0	2F	E0	F0	2F

Notes:

1. * Scan codes differ by mode.
2. * Scan codes differ by overlay function.
3. * Combined with the **Fn** key makes different codes.
4. * **Fn** key does not generate a code by itself.
5. * This key corresponds to key No. 42 in a 102-key model.
6. * Refer to Table D-6, No. 124 key scan code.
7. * Refer to Table D-7, No. 126 key scan code.

Table D-2 Scan codes with left Shift key

Cap No.	Key top	Code set 1				Code set 2			
		Make		Break		Make		Break	
55	/	E0 AA E0 35	E0 B5 E0 2A	E0 F0 12 E0 4A	E0 F0 4A E0 12				
75	INS	E0 AA E0 52	E0 D2 E0 2A	E0 F0 12 E0 70	E0 F0 70 E0 12				
76	DEL	E0 AA E0 53	E0 D3 E0 2A	E0 F0 12 E0 71	E0 F0 71 E0 12				
79	←	E0 AA E0 4B	E0 CB E0 2A	E0 F0 12 E0 6B	E0 F0 6B E0 12				
80	Home	E0 AA E0 47	E0 C7 E0 2A	E0 F0 12 E0 6C	E0 F0 6C E0 12				
81	End	E0 AA E0 4F	E0 CF E0 2A	E0 F0 12 E0 69	E0 F0 69 E0 12				
83	↑	E0 AA E0 48	E0 C8 E0 2A	E0 F0 12 E0 75	E0 F0 75 E0 12				
84	↓	E0 AA E0 50	E0 D0 E0 2A	E0 F0 12 E0 72	E0 F0 72 E0 12				
85	PgUp	E0 AA E0 49	E0 C9 E0 2A	E0 F0 12 E0 7D	E0 F0 7D E0 12				
86	PgDn	E0 AA E0 51	E0 D1 E0 2A	E0 F0 12 E0 7A	E0 F0 7A E0 12				
89	→	E0 AA E0 4D	E0 CD E0 2A	E0 F0 12 E0 74	E0 F0 74 E0 12				
203	Win	E0 AA E0 5B	E0 DB E0 2A	E0 F0 12 E0 1F	E0 F0 1F E0 12				
204	App	E0 AA E0 5D	E0 DD E0 2A	E0 F0 12 E0 2F	E0 F0 2F E0 12				

Note : The table above shows scan codes with the left **Shift** key. In combination with the right **Shift** key, scan codes are changed as listed below:

	With left Shift	With right Shift
Set 1	E0 AA _____	E0 B6
	E0 2A _____	E0 36
Set 2	E0 F0 12 _____	E0 F0 59
	E0 12 _____	E0 59

Table D-3 Scan codes in Numlock mode

Cap No.	Key top	Code set 1				Code set 2			
		Make		Break		Make		Break	
75	INS	E0 2A E0 52	E0 D2 E0 AA	E0 12 E0 70	E0 F0 70 E0 F0 12				
76	DEL	E0 2A E0 53	E0 D3 E0 AA	E0 12 E0 71	E0 F0 71 E0 F0 12				
79	←	E0 2A E0 4B	E0 CB E0 AA	E0 12 E0 6B	E0 F0 6B E0 F0 12				
80	Home	E0 2A E0 47	E0 C7 E0 AA	E0 12 E0 6C	E0 F0 6C E0 F0 12				
81	End	E0 2A E0 4F	E0 CF E0 AA	E0 12 E0 69	E0 F0 69 E0 F0 12				
83	↑	E0 2A E0 48	E0 C8 E0 AA	E0 12 E0 75	E0 F0 75 E0 F0 12				
84	↓	E0 2A E0 50	E0 D0 E0 AA	E0 12 E0 72	E0 F0 72 E0 F0 12				
85	PgUp	E0 2A E0 49	E0 C9 E0 AA	E0 12 E0 7D	E0 F0 7D E0 F0 12				
86	PgDn	E0 2A E0 51	E0 D1 E0 AA	E0 12 E0 7A	E0 F0 7A E0 F0 12				
89	→	E0 2A E0 4D	E0 CD E0 AA	E0 12 E0 74	E0 F0 74 E0 F0 12				
203	Win	E0 2A E0 5B	E0 DB E0 AA	E0 12 E0 1F	E0 F0 1F E0 F0 12				
204	App	E0 2A E0 5D	E0 DD E0 AA	E0 12 E0 2F	E0 F0 2F E0 F0 12				

Table D-4 Scan codes with Fn key

Cap No.	Keytop	Code set 1		Code set 2	
		Make	Break	Make	Break
43	ENT	E0 1C	E0 9C	E0 5A	E0 F0 5A
58	CTRL	E0 1D	E0 9D	E0 14	E0 F0 14
60	LALT	E0 38	E0 B8	E0 11	E0 F0 11
121	ARROW	45	C5	77	F0 77
122	NUMERIC	45	C5	77	F0 77
123	Scrl	46	C5	7E	F0 7E

Table D-5 Scan codes in overlay mode

Cap No.	Keytop		Code set 1		Code set 2		
			Make	Break	Make	Break	
09	8	(8)	48	C8	75	F0	75
10	9	(9)	49	C9	7D	F0	7D
11	0	(*)	37	B7	7C	F0	7C
23	U	(4)	4B	CB	6B	F0	6B
24	I	(5)	4C	CC	73	F0	73
25	O	(6)	4D	CD	74	F0	74
26	P	(-)	4A	CA	7B	F0	7B
37	J	(1)	4F	CF	69	F0	69
38	K	(2)	50	D0	72	F0	72
39	L	(3)	51	D1	7A	F0	7A
40	;	(+)	4E	CE	79	F0	79
52	M	(0)	52	D2	70	F0	70
54	.	(.)	53	D3	71	F0	71
55	/	(/)	E0 35	E0 B5	40 4A	E0 F0	4A

Table D-6 No.124 key scan code

Key top	Shift	Code set 1				Code set 2			
		Make		Break		Make		Break	
Prt Sc	Common	E0 2A	E0 37	E0 B7	E0 AA	E0 12	E0 7C	E0 F0 7C	E0 F0 12
	Ctrl +	E0 37		E0 B7		E0 7C		E0 F0 7C	
	Shift +	E0 37		E0 B7		E0 7C		E0 F0 7C	
	Alt +		54	D4		84		F0 B4	

Table D-7 No.126 key scan code

Key top	Shift	Code set 1						Code set 2							
		Make						Make							
Pause	Common *	E1	1D	45	E1	9D	C5	E1	14	77	E1	F0	14	F0	77
	Ctrl*	E0	46	E0	C6			E0	7E	E0	F0	7E			

*: This key generates only make codes.

Appendix E Key Layout

E.1 United States (US) Keyboard

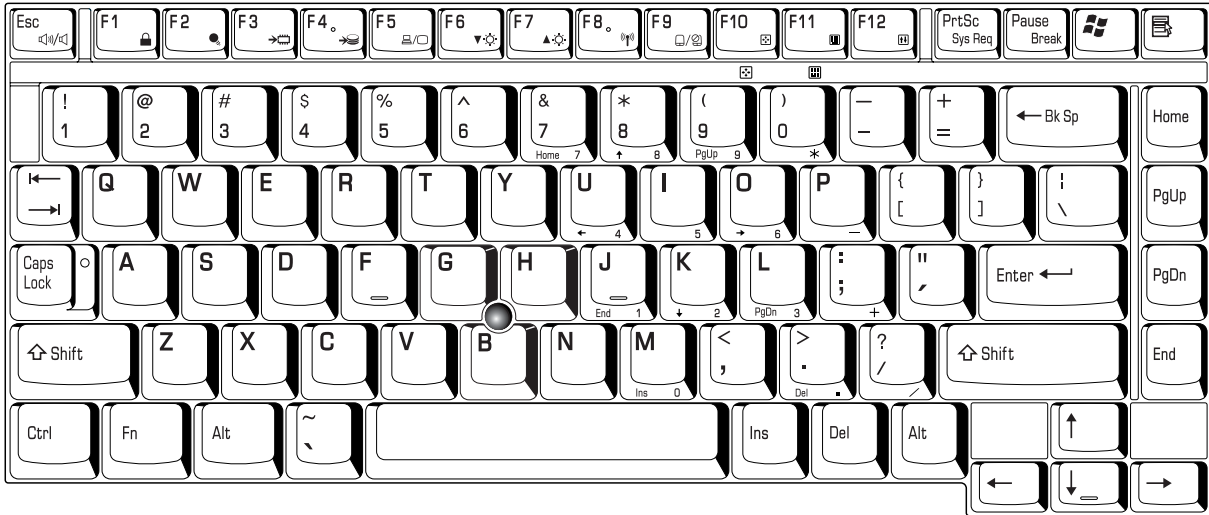


Figure E-1 US keyboard

E.2 United Kingdom (UK) Keyboard

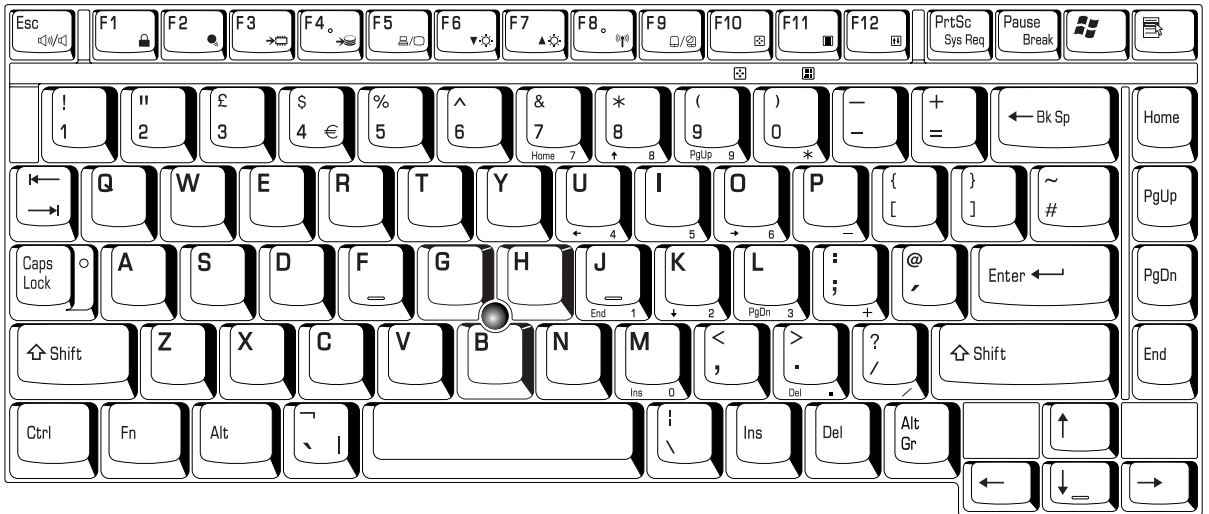


Figure E-2 UK keyboard

E.3 German (GR) Keyboard



Figure E-3 GR keyboard

E.4 French (FR) Keyboard

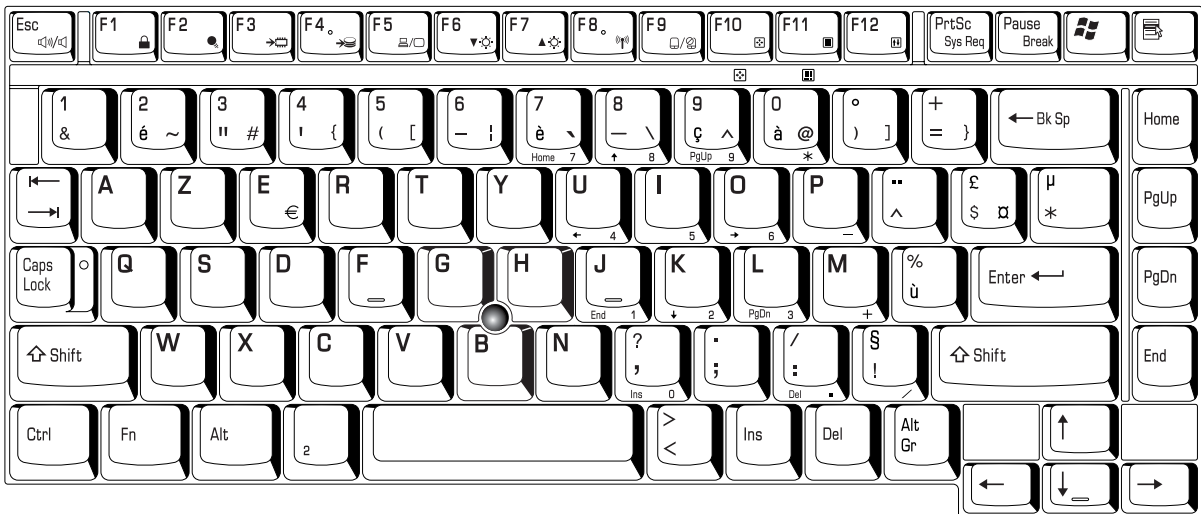


Figure E-4 FR keyboard

E.5 Spanish (SP) Keyboard

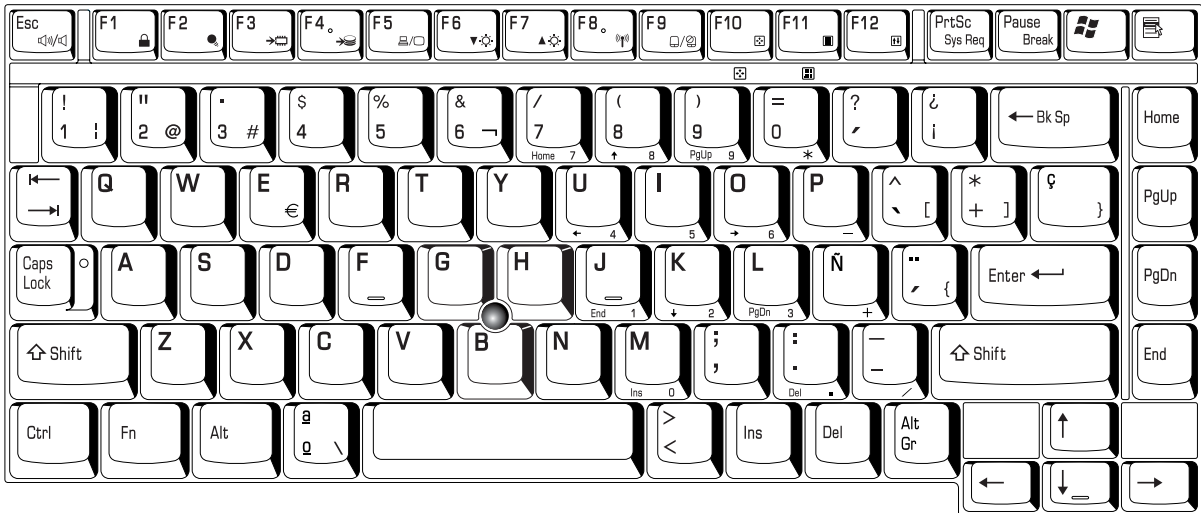


Figure E-5 SP keyboard

E.6 Italian (IT) Keyboard

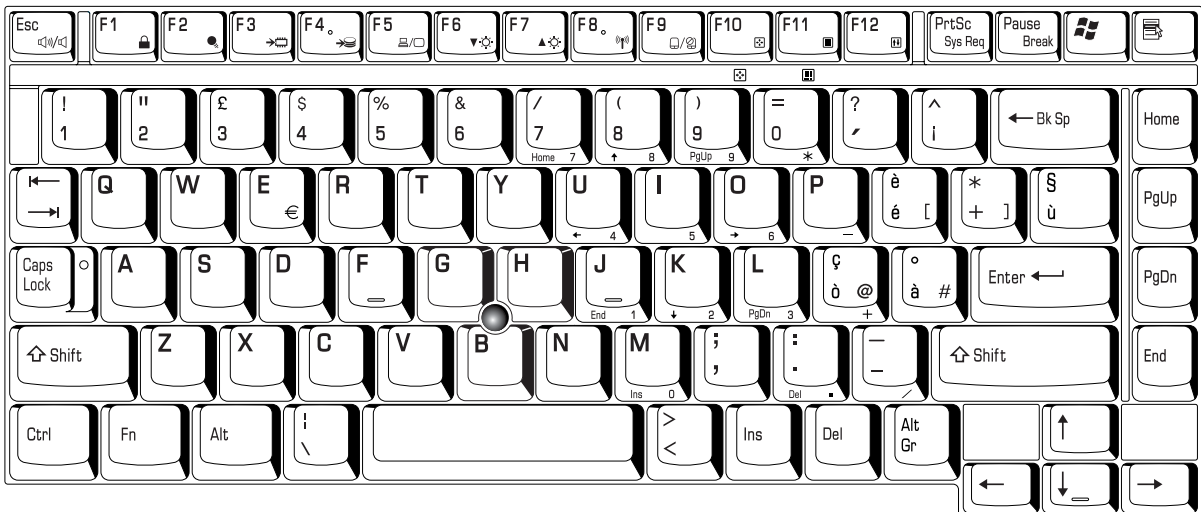


Figure E-6 IT keyboard

E.7 Scandinavian (SC) Keyboard



Figure E-7 SC keyboard

E.8 Swiss-German (SL) Keyboard



Figure E-8 SL keyboard

E.9 Canadian (CS) Keyboard



Figure E-9 CS keyboard

Appendix F Wiring Diagrams

F.1 Parallel Port Wraparound Connector

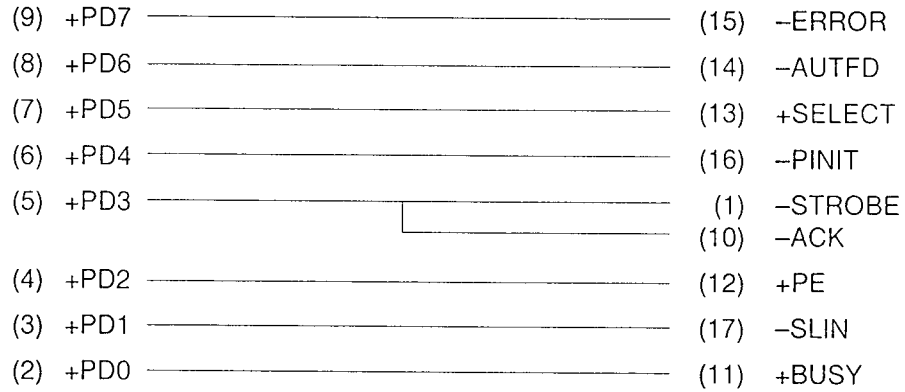


Figure F-1 Parallel port wraparound connector

F.2 Serial Port Wraparound Connector

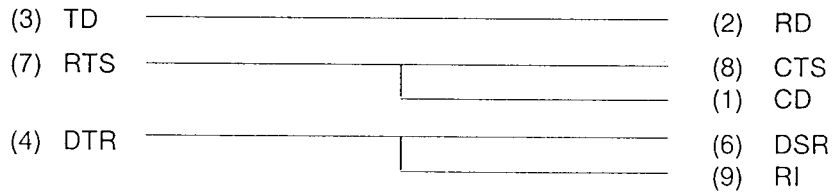


Figure F-2 Serial port wraparound connector

F.3 Serial Port Direct Cable (9-Pin to 9-Pin)

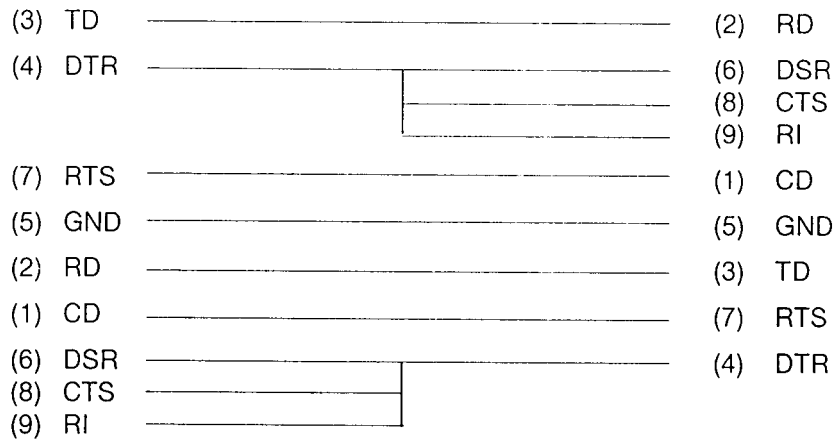


Figure F-3 Serial port direct cable (9-pin to 9-pin)

F.4 Serial Port Direct Cable (9-Pin to 25-Pin)

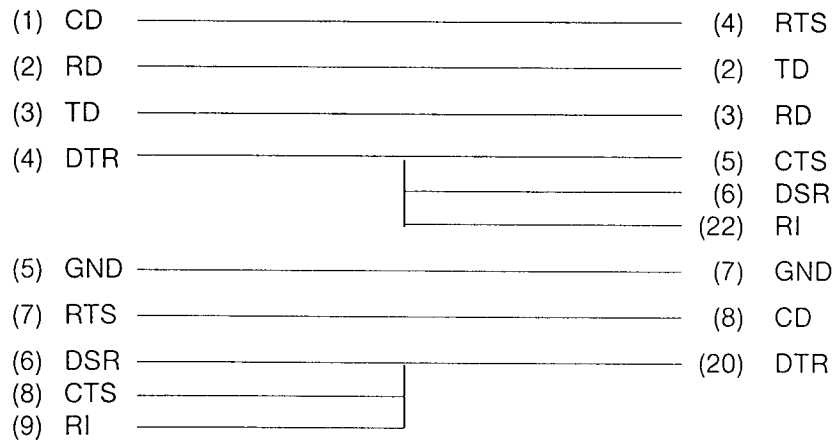


Figure F-4 Serial port direct cable (9-pin to 25-pin)

Appendix G BIOS Rewrite Procedures

This Appendix explains how to rewrite the system BIOS program when you update the system BIOS.

Tools

To rewrite the BIOS, you need the following tool:

- ❑ BIOS/EC/KBC rewriting disk for the computer that has renewed BIOS data.

Rewriting the BIOS

1. Set the system to boot mode.
2. Turn off the power to the computer.
3. Remove the external cable and PC card.
4. Insert the BIOS/EC/KBC rewriting disk into the internal FDD.
5. Turn on the power while holding down the No. 01 key.

For example



(US Keyboard)



(UK Keyboard)

Keep holding down the key until the POWER LED begins to flash. The BIOS rewriting starts.

6. When the process is completed, eject the BIOS/EC/KBC rewriting disk and the system is automatically reset.

Appendix H EC/KBC Rewrite Procedures

This Appendix explains how to rewrite the EC/KBC system program when you update the EC/KBC system.

Tools

To rewrite the EC/KBC, you need the following tool:

- ❑ BIOS/EC/KBC rewriting disk for the computer

Rewriting the EC/KBC

- NOTE:**
1. Rewrite the EC/KBC only when instructed by a diagnostic disk release notice.
 2. Connect the AC adaptor to the computer when you rewrite the EC/KBC.
 3. Do not turn off the power while you are rewriting the EC/KBC. If the rewrite fails, it might be impossible to start up the computer.
 4. If you fail to rewrite EC/KBC, then when you next turn on the power, a message may be displayed that the contents of the EC/KBC has been erased. In this case, insert the BIOS/EC/KBC rewriting disk, and the EC/KBC will be rewritten.
 5. Normally it takes about 30 seconds to rewrite the EC/KBC. It may take 3 minutes (maximum), depending on the conditions of the computer or ICs. The computer is not hung up. Allow sufficient time. Never reboot or turn off the power to the computer before the rewriting is completed.

1. Set the system to boot mode.
2. Turn off the computer.
3. Remove the external cable and PC Card.
4. Insert the BIOS/EC/KBC rewriting disk into the built-in FDD.
5. Turn on the power while holding down the **[Tab]** key. Keep holding down the key until a message appears on the screen.
6. When the EC/KBC rewrite is completed, the system is automatically turned off.

Appendix I Reliability

The following table shows MTBF (Mean Time Between Failures) for each component.

Table I-1 MTBF

Component	Time (hours)
LCD	50,000
Keyboard	40,000
HDD	300,030
FDD	43,800
CD-RW/DVD drive	59,317
AC adaptor	50,000

